The Predictive Value of Certain Tests of Educational Stability as Applied to College Freshmen

Flemming

THE PREDICTIVE VALUE OF CERTAIN TESTS OF EMOTIONAL STABILITY AS APPLIED TO COLLEGE FRESHMEN

BY
EDWIN G. FLEMMING, PH.D.

ARCHIVES OF PSYCHOLOGY
R. S. WOODWORTH, EDITOR
No. 96

NEW YORK
May, 1928

ARCHIVES OF PSYCHOLOGY

COLUMBIA UNIVERSITY, NEW YORK CITY. The Subscription price is six dollars per volume of about 500 pages. Volume I comprises Nos. 2-10, Volume II, Nos. 11-18, Volume III, Nos. 19-25, Volume IV, Nos. 26-32, Volume V, Nos. 33-39, Volume VI, Nos. 40-46, Vol. VII, Nos. 47-52, Vol. VIII, Nos. 53-58, Vol. IX, Nos. 59-63, Vol. X, Nos. 64-68, Vol. XI, 69-73, Vol. XII, 74-78, Vol. XIII, 79-85, Vol. XIV, 86-91, Vol. XV, 92-98. The available numbers are as follows:

2. On the Functions of the Cerebrum: The Frontal Lobes: SHEPHERD IVORY FRANZ. 50c.
3. Empirical Studies in the Theory of Measurement: EDWARD L. THORNDIKE. 50c.
4. Rhythm as a Distinguishing Characteristic of Prose Style: ABRAM LIPSKY. 50c.
5. The Field of Distinct Vision: W. C. RUEDIGER. 70c.
6. The Influence of Bodily Position on Mental Activities: ELMER E. JONES. 50c.
7. A Statistical Study of Literary Merit: FREDERIC LYMAN WELLS. 30c.
8. The Relation Between the Magnitude of the Stimulus and the Time of Reaction: SVEN FROEBERG. 35c.
9. The Perceptual Factors in Reading: FRANCIS MARION HAMILTON. 50c.
10. Time in English Verse Rhythm: WARNER BROWN. 70c.
11. The Hearing of Primitive Peoples: FRANK G. BRUNER. $1.00.
12. Studies in Development and Learning: EDWIN A. KIRKPATRICK. $1.00.
13. The Inaccuracy of Movement: H. L. HOLLINGWORTH. 80c.
14. A Quantitative Study of Rhythm: HERBERT WOODROW. 60c.
15. The Psychology of Efficiency: HENRY ALFORD RUGER. $1.25.
16. On Certain Electrical Processes in the Human Body and their Relation to Emotional Reactions: FREDERIC LYMAN WELLS and ALEXANDER FORBES. 40c.
17. The Relative Merit of Advertisements: EDWARD K. STRONG, JR. $1.00.
18. Attention and Movement in Reaction Time: J. V. BREITWIESER. 50c. (Cloth, 75c.)
19. An Empirical Study of Certain Tests for Individual Differences: MARY THEODORE WHITLEY. $1.25. (Cloth, $1.50.)
20. Visual Acuity with Lights of Different Colors and Intensities: DAVID EDGAR RICE. 50c. (Cloth, 75c.)
21. The Curve of Forgetting: C. H. BEAN. 45c. (Cloth, 70c.)
23. Reaction Time to Retinal Stimulation. A. T. POFFENBERGER, JR. 70c. (Cloth, 95c.)
24. Interference and Adaptability: ARTHUR JEROME CULLER. 75c. (Cloth, $1.00.)
25. Reaction to Multiple Stimuli. JOHN WELHOFF TODD. 60c. (Cloth, 85c.)
26. A Study in Incidental Memory: GARRY C. MYERS. $1.00. (Cloth, $1.25.)
27. A Statistical Study of Eminent Women: CORA SUTTON CASTLE. 80c. (Cloth, $1.05.)
28. The Mental Capacity of the American Negro: MARION J. MAYO. 60c. (Cloth, 85c.)
29. Experimental Studies in Judgment: H. L. HOLLINGWORTH. $1.25. (Cloth, $1.50.)
30. The Psychological Researches of James McKeen Cattell: A Review by Some of His Pupils. $1.00. (Cloth, $1.25.)
31. Fatigue and Its Effects upon Control: ISAAC EMERY ASH. 60c. (Cloth, 85c.)
32. The Transfer Effects of Practice in Cancellation Tests: MELVIN ALBERT MARTIN. 60c. (Cloth, 85c.)
33. The Intellectual Status of Children Who are Public Charges. J. L. STENQUIST, E. L. THORNDIKE and M. R. TRABUE. 50c. (Cloth, 75c.)
34. The Relation of Quickness of Learning to Retentiveness: DARWIN OLIVER LYON. 50c. (Cloth, 75c.)
35. The Overcoming of Distraction and Other Resistances: JOHN J. B. MORGAN. 75c. (Cloth, $1.00.)
36. The Psychology of the Negro—An Experimental Study: GEORGE O. FERGUSON, JR. $1.25. (Cloth, $1.50.)
37. The Effect of Distraction on Reaction Time: JOHN E. EVANS. $1.00. (Cloth, $1.25.)
38. The Effect of Humidity on Nervousness and on General Efficiency: LORLE IDA STECHER. 90c. (Cloth, $1.15.)
39. The Mechanism of Controlled Association. MARK A. MAY. 75c. (Cloth, $1.00.)
40. Recitation as a Factor in Memorizing. ARTHUR I. GATES. $1.00. (Cloth, $1.25.)
41. Mental Fatigue during Continuous Exercise of a Single Function: THOMAS RUSSELL GARTH. 85c. (Cloth, $1.10.)
42. A Psychological Study of Trade-Mark Infringement: RICHARD H. PAYNTER, JR. 85c. (Cloth, $1.10.)
43. Individual Differences and Family Resemblances in Animal Behavior: HALSEY J. BAGG. 70c. (Cloth, $1.00.)
44. Experimental Studies in Recall and Recognition. EDITH MULHALL ACHILLES. 90c. (Cloth, $1.25.)
45. The Morphologic Aspect of Intelligence. SANTE NACCARATI. 70c.
46. Psychological Examination of College Students: F. EDITH CAROTHERS. $1.25.
47. The Effects of Practice on Judgments of Absolute Pitch: EVELYN GOUGH. $1.25.
48. An Experimental Study of Silent Thinking: RUTH S. CLARK. $1.40.
49. Some Emperical Tests in Vocational Selection: HERBERT W. ROGERS. 75 cents.
50. Adenoids and Diseased Tonsils: Their Effect on General Intelligence. MARGARET COBB. $1.00.
51. An Experimental Study of the Factors and Types of Voluntary Choice: ALFRED H. MARTIN. $1.50.
52. Some Well-known Mental Tests Evaluated and Compared: DOROTHY RUTH MORGENTHAU. 80 cents.
53. Mood in Relation to Performance: ELIZABETH T. SULLIVAN. $1.00.
54. The Influence of Incentive and Punishment upon Reaction Time: ALBERT M. JOHANSON. 80c.
55. Psychological Tests Applied to Factory Workers: EMILY THORP BURR. $1.25.
56. A Study of the Relation of Accuracy to Speed: HENRY E. GARRETT. $1.25.
57. An Experimental Study of Hunger in Its Relation to Activity: TOMI WADA. $1.50.
58. Individual Differences as Effected by Practice: GEORGINA STICKLAND GATES $1.00.
59. Studies in Industrial Psychology: ELSIE OSCHRIN BREGMAN. 90 cents.
60. The Mental Status of Psychoneurotics: ALEXANDER D. TENDLER. $1.25.
61. Effects of Attention on the Intensity of Cutaneous Pressure and on Visual Brightness: SIDNEY M. NEWHALL. $1.25.
62. The Measurement of Motor Ability: EVELYN GARFIEL. 90 cents.

(Continued on inside back cover.)

THE PREDICTIVE VALUE OF CERTAIN TESTS OF EMOTIONAL STABILITY AS APPLIED TO COLLEGE FRESHMEN

BY
EDWIN G. FLEMMING, PH.D.

ARCHIVES OF PSYCHOLOGY
R. S. WOODWORTH, Editor
No. 96

NEW YORK
May, 1928

ACKNOWLEDGMENTS

During the three years that this study was in progress valuable aid, in more ways than one, was given by Professor H. E. Garrett of the Department of Psychology of Columbia University. I am glad to take advantage of this opportunity to make public acknowledgment of my great indebtedness to him. Grateful acknowledgment is also made to Mr. Prescott Lecky for the penetrating criticisms he has made of the study while in progress. I am also grateful for the support and encouragement received from Professor R. S. Woodworth and from Professor A. T. Poffenberger which made it easier to carry it through periods of various stress. Professor C. J. Warden and Doctor J. L. Holmes gave much appreciated encouragement at a critical time. To Dean H. E. Hawkes, to Mr. A. L. Jones, to Mr. E. B. Fox, to Miss M. D. Woods, and to the several clerks in the office of Admissions and in the office of the Registrar I am profoundly indebted for permission to use data in their offices and for material aid in gathering data.

EDWIN G. FLEMMING

TABLE OF CONTENTS

TABLES

The Predictive Value of Certain Tests of Emotional Stability as Applied to College Freshmen[1]

CHAPTER I

INTRODUCTION

A decade or more ago, perhaps, the prevailing popular opinion of a college student was that of a youngster carefree, happy-go-lucky, and irresponsible—without a care in the world other than how best to extract money from a reluctant parent, and without a "problem" other than how to "get by" in his classes with as little mental labor as possible. This view is today rapidly changing under the shock of more and better information. The ultra-sophisticated view of life, the cynical attitude toward established institutions, toward other persons and toward themselves, and toward the ideals of civilization, have jarred thoughtful parents from a state of complacency to an alarmed realization of what has long been known to educators and others directly in contact with student life;—that college students are disturbed about morality, about religion, about sex, about their personal relations with society and its institutions, and about the manifold problems which their elders have either solved for themselves or continue to disregard as problems.

Numerous writers have pointed out that the college student does have such problems, and that the college should do something to help them solve the problems. Among those who have written in the professional journals are Paton (47, 48), Blumgart (5), Williams (65, 66), Barker (2), Craig (14), Young (68), Singer (56), Peck (49), Ruggles (55) and Blanton (4). All insist that the problem among college students is a real and significant one demanding serious attention. President MacCracken (38) says: "We feel nowhere in the curriculum the need of more instruction and more study than from the field of mental hygiene." Major Kerns (27) points out that the problem exists also among the students at West Point, who are chosen on the basis of physical and mental fitness.

[1] This report covers one major topic in a project under the general direction of Professor H. E. Garrett, and supported by the Council for Research in the Social Sciences of Columbia University.

Dean Hawkes (22) states that only about twenty or thirty per cent of students who enter state universities remain to graduate; and that at Columbia there is a shrinkage of about forty-three per cent. Such shrinkage is, of course, due to many causes.

Morrison (43) made a survey of the situation in American colleges and universities. He sent a questionnaire to three hundred and forty-two deans in thirty-two state universities, fourteen privately endowed colleges and universities, and eight women's colleges. Opinions concerning the proportion of students having mental difficulties varied considerably—from about two to twenty per cent; but many educators thought there was a need for work in mental hygiene.

Morrison and Diehl (44) made a detailed study of the situation at the University of Minnesota. A questionnaire, a copy of which is printed in their study, was presented to the entering freshmen, 1700 men and 595 women. The answers to the questions gave a history of the individual dealing with his neurotic tendencies. The answers were studied by the investigators and when they indicated *qualitatively* that the student might need help, a letter was sent requesting him to report for a private interview. "No hard and fast rules were followed in the selection of these students, but letters were sent, for example, to those who stammered, had dreads, fears, night terrors and the like, and to those who underlined such words as fits of blues, self-conscious, secretive, day-dreamer, unduly sensitive, etc." One hundred and forty-six boys and forty-four girls were interviewed. About seventy-three, or fifty per cent of the boys interviewed were in need of mental hygiene. The investigators believe that the results "indicate a definite relationship between a suggestive neurotic history and an actual need for mental hygiene."

Laird (28) says: "If college is to prepare adequately for life, measures should be taken to see that the students are mentally adapted to life as it is, instead of graduating *cum laude* and *cum* also bitterness, cynicism, inadequacy, emotionalism, paranoidism, and shoddy idealism."

Those connected with educational institutions know that quietly, unostentatiously something is being done in an attempt to meet the problem. Presidents of colleges and universities, deans, physicians, and the faculties as a whole and individually are alive to the situation and are attempting to do more than

merely pour facts through a funnel into the craniums of their students. Emphasis is almost everywhere being placed upon the individual needs of the students. Numerous devices and experiments are being tried. At Harvard they have installed a modified tutorial system; at Wisconsin an experiment on a large scale is being tried with freshmen. In many colleges the deans are keeping more accurate and more detailed records of the men under their jurisdiction. In some colleges a large portion or all of the time of at least one man is given to a consideration of individual student problems.

At Columbia, for example, the records in the dean's office, besides the regular academic information concerning school marks, and absences, tell much about the personality of the students;—whether the student is a member of a fraternity; whether he was a member of scholarship clubs in high school; whether he received any scholastic honors in high school; whether he had any intellectual or artistic interest outside of his regular school work at high school; whether he participated in athletics at high school; whether he has been ill at college, with what disease or diseases he was afflicted and how long; whether he is generally well read; whether he earns none, some, most or all of his way through college; the amount of time he takes in commuting to and from college each day; the warnings he has received for poor scholarship or other irregularities of conduct, and when and how long he has been on probation; whether he has received a letter of congratulations for good scholarship; and any other matters of special significance which may be of aid in directing the students' activities in college.

The dean at Columbia has frequent interviews on countless problems other than failure in scholarship. He is in close touch with a very large proportion of the student population; and holds himself ever ready to advise and guide on any problem with which the student comes to him.

Psychologists, also, have contributed their time and energy to the attempt to solve this problem. The Woodworth Personal Data Sheet, devised for use in the army, has been used in an attempt to find a solution; the Laird Personal Inventory, Schedule B 2, is said by its author to be of assistance in spotting those who need special aid; and the Pressey Cross Out Test was designed as a tool for the investigation of the emotions.

CHAPTER II

THE PROBLEM

The situation outlined presents a tangle of specific problems, for a complete solution of which the services of the pedagogue, the administrator, the physician, the psychiatrist, and the psychologist probably will have to be enlisted.

From this tangle we have chosen as our specific problem the question of whether any relation can be established between the scores made on the Personal Data Sheet, the Laird Personal Inventory—Schedule B 2, or the Pressey Cross Out Test and the objective behavior of Columbia University freshmen as indicated in the records in the dean's office and from other miscellaneous data secured directly from the students for the purpose of this investigation.

CHAPTER III

A Brief Survey of the Tests

A. The P D Sheet

Woodworth's Personal Data Sheet, better known as the P D Sheet, was designed during the latter part of the World War for the purpose of sorting out quickly and economically those recruits so unstable or potentially so unstable as to make them liable to "nervous breakdown" and consequently poor material from which to make efficient soldiers.

The questionnaire was devised by culling through the lists of symptoms given by men who had subsequently developed some war neurosis. Questions were formulated concerning these symptoms, each question to be answered simply with "yes" or "no." In some cases "yes" was considered the favorable answer, and in others "no" was considered favorable. These questions were tried out on a large number of "normal" individuals, as well as a group of psychoneurotics. If any question was answered "unfavorably" by a large proportion of normals it was eliminated as hardly diagnostic of serious neurotic involvment. The final result yielded one hundred and sixteen questions, dealing with fears, obsessions, phobias, manias, unhealthy personal and sex habits, "nervous" and physical complaints, etc. For example:

14. Do you often have the feeling of suffocating ..... Yes No
78. Are you afraid of responsibility ..... Yes No

The statistical reliability (self-correlation) of this questionnaire was found to be high—approximately .90 (45). The validity of the test; i.e., its adequacy as a measure of emotional instability, was determined by comparing the average number of "unfavorable" answers given by the normal group with the average number of "unfavorable" answers given by the physconeurotics. This difference was found to be reliable. Franz (19) gives the average number of wrong responses for normal whites as about ten. He says: "In a group of known abnormal individuals (12 dementia praecox, 10 neurasthenia, 9 epilepsy, 5 hysteria, 5 psychopathic personality) the number of questions answered wrongly averaged 36." And further: "Probably any individual who answers 20 of the questions wrongly should be suspected of instability. . . . If the num-

ber of 'wrong' answers is greater than 30 grave suspicion of abnormality is warranted."

Hollingworth (24) used the P D Sheet in a study of two groups of psychoneurotic soldiers; the one group was tested before the armistice, and the other after the armistice. The median of the pre-armistice group (126 cases) was 26 wrong answers; the median of the post-armistice group (155 cases) was 11. Hollingworth gives the median of the white recruits as 10; of college students as 10; and of colored recruits as 19. He says: "Cases of neuro-cardiac-asthenia, psychoneuroses, and other disorders encountered in the recruiting service averaged from 30 to 40 points."

The average for the pre-armistice group (figured by the present investigator) is 24.8; and for the post-armistice group 16.0. This difference may be explained as follows: After the armistice a large number of the individuals in the hospital had become cured of their psychoneuroses. Since the war was the immediate cause of their difficulty, the cessation of hostilities effected an almost instantaneous cure. The cause of the trouble having been removed, naturally the symptoms of their psychoneuroses disappeared. Another explanation may be that the two groups were differently motivated, the post-armistice group being more exuberant in outlook and probably possessing a feeling of new life and purpose.

Naccarati and Garrett (45) have used the P D Sheet. They secured no significant statistical results; but concerning the test as a basis of classification they say: "In the first place the reaction of the men to the test was exceptionally good, and secondly, in several cases, its prognosis was strikingly confirmed by other information."

Moore (42), in a study of conservatism and radicalism, used seventy-three questions from the P D Sheet as a criterion of emotional stability; but found no difference in the average scores made by the two groups.

Laird (33) used the original P D Sheet as a criterion and measure of emotional stability in a study of the sex indulgences and psychoneurotic tendencies in middle adolescence. He used only eight single women and ten single men who indulged in sexual intercourse. The women had a higher average score than the seven single women who did not indulge; but there was no difference between the averages of the indulging men and the fifteen celibate men.

Landis, Gullette and Jacobsen (36) correlated scores on the P D Sheet with eight other measures—some objective and some rating scales—of expressiveness, emotionality, and stability. The correlation with ratings of emotionality was .31; and with stability .21. Among other things the authors conclude that "a rating scale of emotionality gave more frequently significant inter-correlations than any other criterion studied here"; that "the Woodworth questionnaire offers a rather good criterion of emotionality, correlating well with rating scale estimates and motor stability tests."

After the present investigation was undertaken and just before it was finished, Garrett and Schneck (20) undertook a study of the P D Sheet from a little different angle.

They used the original data on the P D Sheets secured by Hollingworth in his study of the pre-armistice and the post-armistice psychoneurotics. They analyzed 256 such questionnaires. They used as their normal group for purposes of comparison 100 cases chosen at random from the questionnaires originally used in the present study of Columbia Freshmen.

From a comparison of the averages of the psychoneurotic and normal groups they conclude that on the basis of the mere number of wrong answers, no differentiation is possible between neurotics and normals. The overlapping was nearly fifty per cent. However, by a choice of questions based upon the differential percentages of wrong answers by the two groups, it was possible to devise a differential score which gave a reliable difference when tested out on a second group of normals.

Bridges (7) gave the P D Sheet, with a few minor changes to one hundred and thirty-six men and thirty-two women at the University of Toronto. He found among other things that "women students are more unstable than men, and the arts students more unstable than the medical students. On the whole students are perhaps more unstable than the average of the general population." There was no correlation between instability and intelligence; but there is some indication that "the students who do superior academic work have more psychoneurotic symptoms than the mediocre and inferior students."

A selection of forty-eight questions was used by Everett (16) in a study of school children. The number of wrong answers gave little help in the study of individual cases. She

suggests, however, that the test might be used in disciplinary and other special cases to give a clue to motive, or a hint as to possible effective appeal.

Cady (9) has published the results of a study in which a psychoneurotic questionnaire was adapted from the P D Sheet, and used in a study of incorrigibility. He obtained reliability coefficients of .55 and .47; and a correlation of .36 between scores and teachers' ratings of incorrigibility. He had one hundred and fifty cases. Corrected for attenuation the correlation became .42. He concludes that the use of the questionnaire is justified in investigating the adaptability of students to the school environment.

Terman (62) used the Cady revision of the P D Sheet as a criterion of emotional stability in his study of "genius." He concluded that the gifted, age for age, greatly excelled the control group in emotional stability.

Mead (41) used an abridged form of the P D Sheet as a criterion of emotional response in the study of race differences.

A revision of the P D Sheet which has had rather wide usage is that of Mathews (40). It was validated by comparing the averages obtained by a selected group and an unselected group. The selected group contained fifteen conduct cases (boys), eight definitely diagnosed boys, thirty-seven Protectory girls, and three hundred and seventy-six orphans with nervous or unstable behavior traits. Although the difference between the averages of the two groups is reliable, there is considerable overlapping.

Ratings were also secured on thirty-five selected girls; the correlation between ratings and scores on the first giving of the test was .515; in the case of twenty-eight Protectory girls the correlation between ratings and scores on the second giving of the test was .66.

The author says: "These findings are not so convincing as we should like, but . . . the fact that our results point somewhat vaguely in the right direction encourages us to believe that such a questionnaire will be useful as a means of finding the children in a group who are laboring under special difficulties of this sort."

Slawson (57) used the Mathews revision as a criterion of defective emotional makeup. Sunne (60) accepted the Mathews revision as a valid criterion of emotional stability, as did Bridges and Bridges (8).

In an unpublished study Flemming and Flemming (18) found a correlation of —.15 for eighty-eight girls between scores on the Mathews revision and teachers' estimates of emotional balance.

B. The Laird Test

Laird's Personal Inventory, B 2, which will be called hereafter, the Laird Test, is a revision of his Personal Inventory, B 1, and was developed from Woodworth's Psychoneurotic Inventory (29). Laird's aim was to "find a reliable, objective, and valid method of spotting persons in need of mental hygiene," and to "provide an instrument which would give a fairly precise quantitative measure of the degree and kind of deviation." The Laird Test consists of three sections, each of which contains questions presumably symptomatic of a given form of neurosis. Section I (Psychasthenic) has thirty-two questions designed to determine whether the subject is psychasthenic; section II (Schizophrenic) has fourteen questions supposedly diagnostic of schizophrenia; and section III (Neurasthenic) has twenty questions devoted to neurasthenia. The following are sample questions:

124. Have you worried about little things?

worry about something usually		usually suppress worry over little things		worried about serious things		rather carefree		never a worry	

208. Have you preferred to be alone?

always sought company		sought company on some occasions		enjoyed company but did not seek it		no preference at all		sought solitude most times	

317. Have you been bothered by vomiting?

never		once or twice		several times				many times	

The Laird Test is somewhat more elastic that the P D Sheet in that it permits one of ten possible answers to each question,[2] whereas the P D Sheet requires the subject to underscore either "Yes" or "No." A stencil is provided with the Laird Test to indicate the dividing line between right and wrong answers. The statistical method by which this stencil was devised has been described by Laird (29).

Concerning the value of his test Laird says: (29) "The use of the test in spotting students in need of mental orthosis has

[2] House (25), however, maintains that these ultimately reduce themselves to only three possible answers.

been gratifying. Whether it has found *all* in need of this attention or not is, of course, undeterminable; but it has found a large number for whom there has been a distinct need for orthosis and who would otherwise probably never have been noticed until something serious had occurred."

Laird states further that the tests are in use at several large colleges as well as in one federal hospital, have been employed "by several psychiatrists in private practice for evaluating their patients with reference to a fairly normal group and for keeping case records in quantitative form."

In the mimeographed sheet accompanying the tests, Laird gives the reliability of Schedule B 2 as .88; but neither the P E of this correlation nor the size of the group is given.

Hoitsma (23) reports a statistical study of Schedule B 1, from which B 2 is derived. B 1 has a self correlation by repetition of .85 with a P E of .02; and a self correlation by halves of .79 with a P E of .02. There is no correlation between Schedule B 1 and the score on the Thorndike examination, the coefficient of correlation being .01 with a P E of .05 for men and —.12 with a P E of .06 for women. The correlation between total symptoms on Schedule B 1 and scholarship was .07 with a P E of .08 for men.

Hoitsma thinks that this Schedule and Schedule C 1 can be made into "a valuable aid to administration problems and the selection of personnel." Whatever may be said about Schedule C 1, this conclusion is hardly warranted concerning Schedule B 1 which appears not to correlate with any of the measures used.

C. The X O Test

The Pressey Cross-out Test, which will be referred to as the X O Test, was first suggested by the Presseys in 1919 (53) in a paper which presented two brief scales of intelligence for use with small children, and in which a group scale was suggested for measuring the emotional responses. In 1920 Pressey and Chambers (51) presented the first revision of the cross-out test for use in investigating the emotions, with suggestions for its possible use. In 1921 Pressey (50) published a paper describing in some detail the cross-out test for investigating the emotions, and gave some data to indicate the type of research that is possible with the tests. He says in this paper that "such examinations will be more accurate than the army

scale Alpha in prognosticating unsatisfactory work in college."

The test consists of four parts. In the first part there are twenty-five lines containing five words each; such as:

1. Disgust, fear, sex, suspicion, aunt.

The subject is to cross out every word that is unpleasant. After doing that for each of the twenty-five lines he is to go through the list again and "draw a line around the *one* word in each line that is most unpleasant." If there is no unpleasant word the least pleasant is to be circled.

The second part of the test contains twenty-five lines of five words each. But at the beginning of each line is a sixth word in large type. The subject is to cross out all the words in each line that are connected in his mind with the word in large type at the beginning of the line. He is then to go through the list a second time and encircle the one word in each line that is most associated with the word in large letters.

Parts three and four contain words arranged as in part one and the task is likewise the same; except that in part three words crossed out are to indicate things that the subject thinks wrong and words encircled the one thing in the line that is most wrong. In part four the words refer to things about which the subject has ever worried, or which he has dreaded.[3]

Chambers (10) used the X O Test on two hundred cases in a study of college marks for one quarter. A special "differential score" was devised by selecting those words crossed out which differentiated the high and low quarters in the distribution of average grades. A score of plus one was given for each word that any individual crossed out in the list characteristic of the high quarter, and a score of minus one for each word crossed out that was characteristic of the low quarter. Thus the "net differential score" for each student was computed and correlated with grades, yielding a coefficient of correlation of .54. The correlation between grades and intelligence was .33. The multiple correlation with grades as the criterion was .56.

Checking these results with an additional fifty-seven cases he secured a correlation between the "differential score" and grades of .46 as against .54 in the first part of the study; and a correlation of .53 between grades and intelligence as opposed to .33 in the first section.

---

[3] The methods of computing scores are indicated on page 18.

The correlation between the X O Test and intelligence was in the first part .23; in the second section .51.

This study would seem to indicate that the "differential score" is a measure of college grades. No evidence is given concerning the relation of the X O Test to emotion, to stability, or that it is a test of character traits as referred to by Chambers.

Later Chambers (11) published another study in which he used the X O Test to measure the emotional maturity of children and college students. A differential score was found on the basis of the words crossed out by boys in grades six to twelve. Those words were selected which were marked more frequently by the older boys than by the younger, and the reverse. Words showing a difference of fifteen per cent or more were taken as differential words. The "net differential score" consisted of the total number of words differential of the lower grades crossed out, minus the total number crossed out among the words differential of the upper grades. From his distribution of scores grade by grade he observes: "There is a decided change in the median from grade to grade—a change presumably marking a development or maturing of the child's personality."

Using the test results for diagnostic purposes Chambers was able "in 17 out of 20 cases to indicate the troublesome individuals. Of the three who were not so distinguishable two were borderline cases." His method of picking was based upon deviation from the average of his grade with respect to "net differential score"; and deviation in time taken to consumate the test.

Among the college men "the two cases falling well beyond the 20 points in either direction from the norm of the group were failing their work, and that too, when their intelligence scores on the Ohio State Psychological Examination would not have predicted such a situation."

Zeigler (69) used the X O Test as a criterion of emotional reactivity in the study of a single case. Olson (46) gave the X O Test to twelve men and twelve women subjects with "psychopathic personalities." The psychopaths were found to be "less emotional" than normal college students. Sunne (60) used the test on adults, and a form for children. She stresses the need of further and continued studies in order "to ascertain the significance of the results and obtain reliable norms."

Bond (6) used the X O Test upon one hundred and seventy negro adults, accepting the "total score" as a criterion of "emotional susceptibility," and the "deviation score" as a criterion of "immaturity or peculiarity of judgment or temperament." One of his conclusions is that standard intelligence tests "are a more satisfactory measure of personality than any of the tests of non-intellectual traits here studied. Whereas the correlation of personal judgments with intelligence tests has yielded coefficients as high as .76, the correlation between personal estimation and the Pressey and Downey tests seems to be negligible."

Bridges and Bridges (8) in a study of juvenile delinquency, found that the Pressey X O Test, Form B for children, indicated that these boys, as a group, consider fewer things wrong, but have more worries than normal boys. Pressey scores give low correlations with other factors.

Landis, Gullette and Jacobsen (36) found a correlation of .52 between "deviation score" on the X O Test and estimates of emotionality; a correlation of .24 between the "deviation score" and estimates of stability. Between total score and emotionality the correlation was .24; and between total score and stability it was .13. But they consider the test scored for idiosyncrasy less reliable statistically than when scored for affectivity. They studied only twenty-five cases.

D. Reliability

The first requisite of any test which is designed to be used as a measure is that it be reliable. Without reliability no test is of any value as a measure nor of any value as a basis of prediction.

The three tests used in this investigation have satisfactory reliability. Naccarati and Garrett (45) give the reliability of the Woodworth P D Sheet as .90 or more. The present investigator found its reliability by the "split-half technique" for 341 cases to be .80; and when corrected by Brown's formula the reliability of the whole test is .89 with a probable error of .008.

The reliability of the Laird Test by the "split-half technique" and then corrected by Brown's formula for the whole test is .78 with 332 cases. The probable error is .015. In the sheet of explanations sent by the publisher with the test, the

reliability is given as .88, although the size of the group from which this figure was derived is not given.

In studying the Pressey Test two separate scores have been calculated; the one called "total score," and the other called "deviation score." The total score is found by simply counting the number of words that have been crossed out in the four parts of the test. The author states (50) that he does not expect much from the total score. The deviation score is found by first determining the modal choice of the group studied for each line of five words in the test. In determining the modal choice only the one word circled in each line is considered. After the modal choice of each line has been found, each paper is examined with reference to the modal choice. If the word circled in any given line is the same as the modal choice the individual is considered not to deviate. If the word circled in any line by a given individual is any one of the four not the modal choice word, the individual is considered to deviate from the group choice in that case. The deviation score is then the total number of such deviations.

No published reliability coefficients for either of these scores on the Pressey X O Test have been found.

The present investigator, however, finds a reliability for the total score, correlating the odd numbered lines in the test with the even numbered lines, to be .94 for 328 cases, which, when corrected by Brown's formula becomes .97 for the whole test with a probable error of .002. The reliability of the deviation score by the "split-half technique" for 311 cases is .34, which becomes, when corrected for the whole test, .50 with a probable error of .03. The low reliability of this deviation score points to the possibility of a low reliability for the differential scores obtained by Chambers. (10). The reliability of Chambers' differential score therefore needs to be demonstrated before his results can be accepted at their face value.

Summary

This survey of the studies that have been published in which one of the three tests mentioned had been used, indicates that the authors or users of the tests believed that they were somehow concerned with the measurement of emotion, of emotional stability, or of adjustment. None of the studies, however, has secured satisfactorily significant results which would indicate that the tests could be used quantitatively to predict behavior.

In few cases has the correlation technique been used, and in none of them with entirely satisfactory results. Some of the revisions of the Woodworth Test appear to correlate somewhat with juvenile delinquency, and the Mathews revision seems to have some correlation with estimates of the degree of instability within a definitely selected group. But enough exhaustive studies have not yet been made with any of the tests to warrant a conclusion about their value.

CHAPTER IV

PROCEDURE

Administration of Tests

The Woodworth P D Sheet was given, about December 1, 1925, to 341 freshmen in Columbia College of Columbia University. In giving the test it was deemed advisable to eliminate five of the questions dealing with liquor and with sex, so that the questionnaire used consisted of 111 of the original 116 questions. Additional information was also secured about occupation of father, time spent in social recreation, exercise, study and sleep. The test was given by one individual to about six separate groups of freshmen as determined by registration in classes in physical education. The scoring was done by a single examiner with the aid of a stencil, so that the scores are entirely objective.

The Laird Test and the Pressey X O Test[4] were given to such groups of freshmen as registered in the classes in physical education in Columbia College of Columbia University about December 1, 1926. The tests were given by two investigators who had been working together on research projects for over a year, and who were familiar with the tests and the technique of administering them. There were 332 subjects on the Laird Test. On the X O Test, however, several subjects failed to follow instructions so that there were 328 cases on the total score, and 311 cases on the deviation score. Additional information was secured covering such matters as occupation of father, time spent in social recreation, exercise, study and in sleep. In 1925 the number of hours per week spent in study was called for; but in 1926 the number of hours per day was requested.

Both the Laird Test and the X O Test were scored by the same examiner who scored the P D Sheet. With the Laird Test a stencil provided by the publisher of the test was used. With the X O Test it was merely the simple task of counting the words crossed out, and determining the modal choices as indicated heretofore; so that the scoring on these two tests was also entirely objective.

[4] Copies of the Laird Test may be secured from The Hamilton Republican, Hamilton, N. Y. The X O Test and the Woodworth P D Sheet may be obtained from C. H. Stoelting Co., Chicago, Ill.

Thorndike Scores

The scores on the Thorndike Intelligence Examination for High School Graduates used in this study were secured from the official records in the Office of Admissions of Columbia University. The scholarship grades and records of over-cuts of classes were obtained from the official records in the registrar's office of Columbia University. Other data were copied from the official records in the office of the dean of Columbia College. All these records are accurately kept by competent, paid clerks, or secretaries to the officers.

Subjects

In the correlations and detailed analyses of the data the records of all foreign born students were eliminated. Although the records of all the remaining students were not absolutely complete, all cases were used when data were available for the purpose of the particular correlation being obtained. The overlapping in all intercorrelations is considerable, since the number of cases represented in any correlation is always around 300 or more. While the number of cases used in the inter-correlations varies to some extent, the total number used was always large and represented an adequate random sampling of the freshman class of Columbia College for the year in which the data were secured.

Scholarship Grades

In order to use the scholarship grades in the correlations, and in other computations, it was necessary to transmute the letter grades given in Columbia College into numbers. The letters used are A, B, C, D, and F. A, B, and C are definite passing marks. D is a conditional pass, which the student may attempt to raise by an additional examination. F is failure.

Wood (67) used 11, 8, 6, 4, and 1 to represent the various letter grades. The use of even intervals of one is supported by the practise of Flemming (17), Somers (58), Toops (63), Clem (12), Liu (37), and the Institute of Educational Research in the Vocational Guidance Inquiry. But before adopting either the method used by Wood, or the method of transmuting the letter grades into numbers by assigning 0 for F, and 1, 2, 3, or 4 for the other grades up to A, the grades for 488 students were tabulated and the percentage of students making each grade determined. It was arbitrarily decided not to in-

clude grades in physical education. It was found that 9.11 per cent made A; 32.85 per cent made B; 48.00 per cent made C; 1.73 per cent made D; and 8.31 per cent made F.

The mid-point sigma value of each step was then computed from Table 22, pp. 117-121, in Thorndike's *An Introduction to the Theory of Mental and Social Measurements*, second edition, 1913, with the following results:

A	B	C	D	F
1.81	.69	—.45	—1.35	—1.86

From these mid-point sigma values of each step the following values for each letter were assigned.[5]

A	B	C	D	F
3	1	—1	—2.5	—3.5

There were then three methods of assigning numerical values to letter grades, as follows:

TABLE I
Number Values Assignable to Letter Grades

	A	*B*	*C*	*D*	*F*
Method a	3	1	—1	—2.5	—3.5
Method b	3	2	1	.5	0
Method c	11	8	6	4	1

No credit was given in any case where no credit was given in the official records of the registrar.

The inter-correlations of scores obtained by each of these methods with scores obtained by the other methods, and with scores on the Thorndike examination were then computed and appear in the following table. (Table II.)

TABLE II
Inter-correlations Between Thorndike Scores and Scholarship Scores Computed by Three Different Methods. N = 470

Method of Transmuting Letter Grades	b	c	Thorndike
a	.95 ±.003	.89 ±.006	.43 ±.025
b		.97 ±.002	.47 ±.02
c			.45 ±.02

[5] These values have been assigned somewhat arbitrarily, although based roughly upon the sigma values found. It was desired to weight F more heavily than A, and to make the differences between A, B, and C equal, since the differences in sigma values are nearly equal.

These inter-correlations indicate that any one of the three methods is virtually the equivalent of the others, and that practically it would not make any material difference which one was used. The correlations with the Thorndike examination indicate that method b probably is the most satisfactory. In accordance with this evidence it was then decided to use method b, because it was the simplest to figure in any subsequent uses of a scholarship score, and because it gave a higher correlation with the Thorndike examination than any of the others.

Accomplishment Index

The Thorndike examination is generally considered to be a valid measure of the intelligence and educational knowledge required for success in an academic environment, but the correlation of .63 that Wood found between the Thorndike examination and scholarship scores of one hundred and eleven selected freshmen, and the correlation of .47 that was found in this study (Table II) indicate that students do not entirely come up to expectations as based on the results of the Thorndike examination. Hence, it seemed desirable to devise a score or index which would indicate the extent of this discrepancy. It is called the Accomplishment Index, and will be designated as AI.

The method of computing the AI was as follows. The P E position for any given Thorndike score was found by subtracting the average Thorndike score from the given score of the individual and dividing the difference by the probable error of the distribution. The same thing was done to find the P E position of each scholarship score. Each scholarship score and each Thorndike score was thus represented by a plus or minus P E value dependent upon its distance above or below the average of its own distribution. These P E positions are comparable, because they are expressed in terms of the probable error of their own distributions from zero as the central tendency and P E equal to one, and not in terms of raw scores. Consequently, a student with a P E position of plus two on the Thorndike examination, and a P E position of plus one on the scholarship ratings did not accomplish as much as was to be expected on the basis of the Thorndike examination; whereas an individual with a P E position of minus one on the Thorndike examination and a P E position of plus one in scholarship did better

than was expected by a difference of two P E. To determine this "Accomplishment Index" the Thorndike P E position was subtracted from the scholarship P E position, and the difference multiplied by ten to avoid the decimal. If the sign was plus the individual did better than expected; and if the sign was minus the student did not accomplish as much as expected on the basis of the Thorndike examination.

Economic Status

The economic status of the fathers of these subjects was given a numerical value in accordance with the scale devised by F. E. Barr, and appearing in Terman's Genetic Studies in Genius, pages 67ff. The values assigned to occupations represent the average positions given by thirty judges on the basis of the probable intelligence required for ordinary success. In a few cases where there was any doubt of the occupation of the father of a subject the economic status was omitted from the data used in this investigation.

CHAPTER V

RESULTS

A. The P D Sheet

The correlation technique was possible with part of the data secured. The correlations between scores on the P D Sheet and other measures are given in the following table. (Table III.)

TABLE III
Correlation of the P D Sheet with

	r	*P E*		*r*	*P E*
Scholarship	.03	.04	Time spent in		
Thorndike	.01	.04	Soc. Recreation	—.08	.04
Accomp. Index	.02	.04	Exercise	—.19	.04
Economic Status of			Study	.10	.04
father	—.05	.04	Sleep	—.21	.04
Age[6]	.11	.03			

None of these correlations is significant; indeed, it may be said that there is no correlation between scores on the P D Sheet and any of the above measures. It is possible, however, that the correlation technique obscures results, and that there may be some significant differences between the extremes of the group. It was consequently decided to divide the group, and compare the extremes, by taking those approximately more

TABLE IV
Average Scores on Various Measures Made by "High" and "Low" Groups on the P D Sheet

P D Sheet	All	"High" Score 18-44	"Low" Score 0-8	Diff.	Sigma of Diff.	Reliab. Index	Chances that Diff. is Rel.
Scholarship	44.85	45.05	43.04	2.01	2.62	.77	78
Thorndike	83.09	83.64	82.76	.88	1.63	.54	71
Accomp. Index	.01	—.22	—.70	.48	2.21	.22	58
Economic Status of Father	12.58	12.40	12.90	.50	.39	1.26	90
Age	18.67	19.02	18.37	.65	.29	2.22	98.7
Time Spent in[7]							
Soc. Recreation	10.47	10.56	11.42	.86	1.09	.79	78
Exercise	8.87	8.04	10.06	2.02	.79	2.54	99
Study	21.84	22.65	20.27	2.38	1.50	1.58	94
Sleep	55.18	53.29	56.78	3.50	.98	3.57	99.9

[6] A change in age groups throughout this study does not mean a change with age, necessarily, but rather a difference between young and old freshmen.

[7] Hours per week.

than one probable error above the average and those approximately more than one probable error below the average.

The foregoing table (Table IV) shows the average score in the various measures for *all* subjects taking the P D Sheet, for those making the highest scores on the P D Sheet, for those

TABLE V

Average P D Scores for the Various Measure Groups and for the Groups Making the Extreme Scores on Those Measures

Scholarship		*Thorndike*	
All	14.32	All	14.52
Score 55-94	13.69	Score 90-119	14.96
Score 0-29	14.52	Score 40-74	15.96
Difference	.83	Difference	1.00
Sigma of Diff.	1.27	Sigma of Diff.	1.45
Reliability Index	.65	Reliability Index	.69
Chances that difference is reliable	74	Chances that difference is reliable	75
Accomplishment Index		*Economic Status of Father*	
All	14.35	All	14.24
Score 10-14	15.03	Score 14-17	13.27
Score (—11)-(—45)	14.23	Score 3-10	13.95
Difference	.81	Difference	.68
Sigma of Diff.	1.47	Sigma of Diff.	1.40
Reliability Index	.55	Reliability Index	.48
Chances that difference is reliable	71	Chances that difference is reliable	68
Age		*Time Spent in Social Recreation*	
All	14.49	All	14.50
Age 20-28	17.48	Hrs. per wk. 15-41	12.52
Age 15-16	14.62	Hrs. per wk. 0-5	15.56
Difference	2.85	Difference	3.05
Sigma of Diff.	1.70	Sigma of Diff.	1.38
Reliability Index	1.68	Reliability Index	2.21
Chances that difference is reliable	95	Chances that difference is reliable	98.6
Time Spent in Exercise		*Time Spent in Study*	
All	14.43	All	14.43
Hrs. per wk. 12-31	12.73	Hrs. per wk. 25-74	16.05
Hrs. per wk. 0-5	15.46	Hrs. per wk. 0-14	13.77
Difference	2.73	Difference	2.27
Sigma of Diff.	1.26	Sigma of Diff.	1.35
Reliability Index	2.16	Reliability Index	1.68
Chances that difference is reliable	98	Chances that difference is reliable	95

Time Spent in Sleep	
All	14.43
Hrs. per wk. 60-77	12.93
Hrs. per wk. 27-50	16.56
Difference	3.63
Sigma of Diff.	1.27
Reliability Index	2.86
Chances that difference is reliable	99.8

making the lowest scores on the P D Sheet, the difference between these two extremes, the sigma of the difference, the index of reliability of the difference, and the chances in one hundred that the difference is reliable.

The table on page 26 (Table V) shows the average P D score made by all the subjects for whom there are scores on the various measures, the average P D score for those making extremely low scores and extremely high scores on the various other measures, the difference between the P D scores of these extreme groups, the sigma of the difference, the index of reliability of the difference, and the chances in one hundred that the difference is reliable.

An examination of the two preceding tables (Tables IV and V) shows that there is no conventionally reliable difference in the scores made on the various measures between those who make "high" scores on the P D Sheet and those who make "low" scores on the P D Sheet; except that those who make "high" scores on the P D Sheet sleep less by about three and a half hours per week than those who make "low" scores on the P D Sheet, and that there is almost a conventionally reliable difference (plus or minus three sigma) with respect to exercise. The chances are almost ninety-nine in one hundred that those who make "high" scores are about a year older than those who make "low" scores.

It appears that there is no conventionally reliable difference in the average score made on the P D Sheet between "high" and "low" scoring groups on the other measures; except again that there is nearly a reliable difference with respect to sleep —ninety-nine and eight-tenths chances in one hundred that those taking the most sleep have lower scores on the P D Sheet by about three and a half points than those taking the least sleep. There is also an index of reliability of over two with respect to exercise; ninety-eight chances in one hundred that those taking the greatest amount of exercise make a slightly lower score on the P D Sheet than those taking the least amount of exercise. There are about ninety-eight and six-tenths chances in one hundred that those spending the least time in social recreation make a higher score by three points than those spending the most time in social recreation. The chances are ninety-five in one hundred that those spending the most time in study have on an average higher scores; and also ninety-five in one hundred that the oldest students have higher scores.

If one assume that in some way the P D Sheet is an index of maladjustment or emotional instability, the reliable and near-reliable differences with respect to exercise and sleep may give support to the prevailing practice of advising the maladjusted problem cases to take more exercise, especially when the patient is obviously in bad physical condition. Whether or not lack of sleep and of exercise is the cause of maladjustment is not revealed by this investigation; it is possible, however, that individuals with tendencies to maladjustment give greater evidences of their condition when insufficient sleep and exer-

TABLE VI

Percentages of the P D Groups (Low, Middle, High) Falling within the Classifications Indicated

	P D Sheet 0-8	*P D Sheet 9-17*	*P D Sheet 18-44*	*Difference between High and Low Groups*
Membership in fraternity	22.5	16.5	23.2	+ 0.7[8]
Member of scholarship clubs in h. s., or receiver of scholastic honors	28.4	32.2	38.3	+ 9.8
Intellectual or artistic interests in h. s. (e.g., debate, orchestra), except scholarship clubs or honors; social clubs	68.3	60.6	57.5	—11.8
Athletic activity in h. s.	46.0	46.4	37.3	— 8.7
Some extra-curricular activity in h. s., except scholarship clubs and honors	76.2	76.3	65.3	—15.9
Illness at college	22.7	30.1	24.2	+ 1.5
Recorded as well read	35.6	37.4	33.3	— 2.3
Earns none	50.4	41.2	45.4	— 5.0
Earns some	36.6	40.4	37.3	+ 0.7
Earns most or all	12.8	18.2	17.1	+ 4.3
Commute less than one hr.	47.5	42.0	44.4	— 3.1
Commute from one to two hrs.	41.5	42.0	47.4	+ 5.9
Commute two hours or more	10.8	15.8	8.0	— 2.8
Extra-curricular activity in college	27.7	30.9	21.2	— 6.5
Warned by the dean; probation; or special discipline	26.7	23.0	26.2	— 0.5
Congratulations	8.9	12.6	18.1	+ 9.2
No warning; no probation; no discipline; no congratulations	64.3	65.8	55.5	— 8.8
Withdrew or dropped	14.8	16.6	14.1	— 0.7
Over-cut classes	28.7	36.5	32.3	+ 3.6

[8] The plus sign means that a larger percentage of the "high" P D group falls within the given classifications; the minus sign that a larger percentage of the "low" P D group falls within the given classifications.

cise have been had. It may be that with less exercise and sleep than is now being taken by those making high scores on the P D Sheet, definite psychopathic cases might develop. This, however, is a problem for further research and can not be solved by the data gathered in this investigation. Which is cause and which is effect is not indicated; it only appears that lack of sleep and of exercise are to some extent associated with high P D scores.

Data available in the dean's office recording evidence of various types of objective behavior were then examined. The preceding table (Table VI) shows the percentages of students in the middle group on the P D Sheet, and in the two extreme groups on the P D Sheet that fall within the classifications indicated in the column to the left.

The average difference, regardless of sign, between the percentages of the "high" and "low" P D groups that fall within the classifications given in the preceding table is 5.3, and the sigma of the distribution is 4.2. Considering, therefore, those differences of some significance which are more than one sigma above the average, it would appear that a larger percentage of those with high P D scores have tendencies to superior scholarship in high school, and that a larger percentage of those who have high P D scores receive letters of congratulation from the dean for superior scholarship in college. It also appears that those who have low P D scores show a larger percentage participating in some kind of extra-curricular activities in high school, and particularly in social club affairs and such activities as debate, dramatics, glee club, and orchestra.

Now, if we take the fraternity group and the non-fraternity group, and so on down the list, and compare the average scores on the P D Sheet made by the opposing groups, the differences and reliabilities of the differences appear in the following table. (Table VII.)

TABLE VII

Averaged P D Scores Made by the Opposing Groups as Indicated, the Differences Between the Averages and the Reliability of the Differences. The Average P D Score of *All* Subjects is 14.32

	Av.	*Diff.*	*Sigma of Diff.*	*Index of Rel.*	*Chances that Diff. is Rel.*
Fraternity	14.31				
No fraternity	14.24	.07	1.13	.09	54
Scholarship club in h. s.	15.14				
No scholarship club in h. s.	13.87	1.27	1.00	1.20	88
Intell. or art. int. in h. s.	13.63				
No intell. or art. int.	15.41	1.78	.99	1.83	97
Athletic activity in h. s.	13.50				
No athletic act. in h. s.	14.95	1.45	.94	1.55	94
Some extra-cur. act. in h. s.	13.73				
No extra-cur. act. in h. s.	15.61	1.88	1.08	1.75	96
Illness at college	14.81				
No illness at college	14.15	.66	1.11	.63	74
Well read	14.61				
Not well read	14.16	.45	1.00	.45	67
Earns none	13.91				
Earns some	14.53	.62	1.05	.57	72
Earns none	13.91				
Earns most or all	14.97	1.06	1.34	.82	79
Commute less than 1 hr.	14.37				
Commute from 1-2 hrs.	14.73	.36	1.05	.29	61
Commute less than 1 hr.	14.37				
Commute more than 2 hrs.	12.65	1.71	1.21	1.42	92
Extra-cur. act. at college	13.40				
No extra-cur. act. at college	14.66	1.26	1.01	1.28	90
Warning or probation	14.45				
No warning or probation, nor congratulations	13.82	.63	1.18	.51	69
Warning or probation	14.45				
Congratulations	16.50	2.05	1.70	1.21	89
Congratulations	16.50				
No warning or probation, nor congratulations	13.82	2.68	1.47	1.84	97
Withdrew or dropped	14.88				
Remained	14.22	.66	1.29	.54	71
Over-cut classes	14.62				
No over-cut classes	14.14	.47	1.01	.47	68

There appears to be no conventionally reliable difference between the average P D scores made by the various opposing groups indicated in Table VII. However the chances are from ninety-four to ninety-seven in one hundred that those who, in high school, have no interests outside scholastic achievement make, on the average, a slightly higher score on the P D Sheet than those who have such interests. The chances are ninety-two in one hundred that those who commute more than two hours a day at college make on the average a slightly lower P D score than those who commute less than one hour a day. And

the chances are ninety-seven in one hundred that those who receive congratulations from the dean for superior scholarship make on the average a higher P D score by about two and a half points than those who receive no apparent attention from the dean, either by way of congratulations or warning or probation.

If we take the fraternity group and the non-fraternity group, and so on down the list, and compare the distribution of scores made by the opposing groups, the percentages of overlapping of the distributions appear in the following table. (Table VIII.)

TABLE VIII

Percentage of Overlapping on the P D Sheet of the Opposing Groups as Indicated[9]

Fraternity, and no fraternity	50
Scholarship clubs and honors, and no scholarship clubs and honors—in h. s.	55
Intellectual or artistic interests, and no intellectual or artistic interests—in h. s.	38
Athletic activity, and no athletic activity—in h. s.	45
Some extra-curricular activity, and no extra-curricular activity—in h. s.	38
Illness at college, and no illness at college	52
Well read, and not well read	53
Earns none and earns some	45
Earns none, and earns most or all	44
Commute less than one hour, and commute between one and two hours	49
Commute less than one hour, and commute two hours or more	53
Extra-curricular activity at college, and no extra-curricular activity at college	43
Warning or probation, and no warning nor probation nor congratulations	54
Warning or probation, and congratulations	43
Congratulations, and no warning, probation nor congratulations	62
Withdrew or dropped, and continued in college	53
Over-cut classes, and did not over-cut classes	51

Taking fifty per cent of overlapping as complete coincidence of the compared distributions, the average deviation from complete coincidence of the groups compared is 5.2 per cent. The sigma of the distribution of deviations is 3.7. Considering, therefore, those overlappings of significance which deviate more than one sigma beyond the average and away from perfect coincidence, it appears that those who have intellectual or artistic interests in high school, such as debate, dramatics, glee club, orchestra, and social clubs, have lower scores on

[9] The figures signify that the group first mentioned reaches or exceeds in the specified percentage of cases the average of the group mentioned second.

the P D Sheet than those who have no such interests. Those who participate in some kind of extra-curricular activities, except scholarship clubs or scholastic honors, also have lower scores on the P D Sheet. Those who receive letters of congratulation from the dean for superior scholarship have higher scores on the P D Sheet.

Combining the "significant" differences found in these tables (Tables VI, VII and VIII) it appears that there is some relation between high P D scores and absence of participation in extra-curricular activities in high school, and especially absence of participation in social activities, debate, dramatics, glee club, orchestra, and such activities as seem to have fairly definite social aspects; and also some relation between high P D scores and superior achievement in college as indicated by the receipt of letters of congratulation from the dean.

Since there is a correlation of only .01 between scores on the P D Sheet and Thorndike scores the apparent superior achievement of those making high P D scores can not be attributed to their superior intelligence. It may be that they are compensating for the presence of symptoms as reported in the P D Sheet by withdrawing from social and other college activities and putting forth greater effort in the attainment of a superior scholarship; possibly that high P D scores represent a drive toward intellectual achievement; or that those who put forth great effort to achieve tend to become involved with a larger number of psychoneurotic symptoms.[10]

However, it is impossible to predict scholarship on the basis of P D scores, since the correlation between the two measures is only .03. Holding the Thorndike score constant, the correlation between grades and the P D Sheet becomes .02. Holding the P D score constant, the correlation between Thorndike and grades remains unchanged at .47. The multiple correlation between grades, and Thorndike plus the P D score shows no change from the simple correlation between Thorndike and

[10] A comparison with Hollingworth's results before and after the armistice is not inappropriate. The difference between pre-armistice and post-armistice times (for the soldier) might be something like the difference between term time and vacation; and those students who treat term time like vacation would then resemble the post-armistice soldier rather than the pre-armistic.

At any rate, a correlation or difference does not indicate directly any causal relation. We couldn't argue that the emotional condition revealed by the P. D. Sheet was necessarily the "drive" towards hard study; for the real relation might be that hard study fostered this emotional condition, just as war conditions did to the soldier, only in a slighter degree.

grades. These results from partial and multiple correlation are to be expected from the practically zero correlation between the P D scores and the other two measures.

It appears then that there is some positive relation between high scores on the P D Sheet and greater age, greater time spent in study, and superior scholarship; that there is some negative relation between high scores on the P D Sheet and much time spent in exercise, sleep, and social recreation or participation in extra-curricular activities; but that none of the relations is of such a nature as to be revealed by the correlation technique, nor to permit prediction of behavior on the basis of P D Sheet score.

A comparison of the average scores made by Columbia freshmen and other groups is of some interest.

TABLE IX
Average Scores on the P D Sheet Made by Various Groups

	Investigator	*Number of Cases*	*Average*
Columbia men	Flemming	324	14.5
Pre-armistice Psychoneurotics	Hollingworth	117	24.8
Post-armistice Psychoneurotics	Hollingworth	202	16.0
Psychoneurotics	Hollingworth	319	19.2
Men	Bridges	136	13.6
Women	Bridges	32	20.3
Medical men	Bridges	114	12.9
Arts men	Bridges	22	17.4
Medical women	Bridges	7	15.9
Arts women	Bridges	25	21.6
Delinquent girls	Bridges	33	28.5
Army men	Given by Franz	?	10.0
Abnormal men	Given by Franz	41	36.0

The highest average score is made by the abnormal men, the next highest by the delinquent girls, and the third highest by the pre-armistice psychoneurotics. The lowest score was made by the men tested in the army. It appears from this table that "normal" college students, whether men or women, make higher average scores than the general run of the "white draft," but lower average scores than the avowedly psychoneurotic or delinquent.

B. The Laird Test

Although the Laird Test is based upon the P D Sheet, it does not necessarily follow that the same or even similar results as those obtained with the P D Sheet will be obtained with this

test. The Laird Test eliminates the necessity of categorical "yes" or "no" answers and permits of graded answers. The rightness or wrongness of the answer was determined from empirical results.

The correlations between scores on the Laird Test and other measures are given in the following table. (Table X.)

TABLE X
Correlation of the Laird Test with

	r	*PE*		*r*	*PE*
Scholarship	.11	.04	Time spent in		
Thorndike	—.004	.04	Soc. Recreation	—.01	.04
Accomp. Index	.06	.04	Exercise	—.11	.04
Economic Status of			Study	—.03	.04
Father	.09	.04	Sleep	—.07	.04
Age	.02	.04			

There appears to be no correlation between the Laird Test and any of these measures; it does not correlate with scholarship, Thorndike, accomplishment index, nor with the economic status of the father. It appears to have no relation with the time spent in social recreation, exercise, study or sleep. The Laird Test does not measure any of the things indicated in the above table. (Table X.)

The group was then divided by taking those approximately more than one probable error above the average and those approximately more than one probable error below the average. The two extreme groups were then compared with respect to their average scores on the various measures.

The following table (Table XI) shows the average score on

TABLE XI
Average Scores on the Various Measures Made by "High" and "Low" Groups on the Laird Test

Laird Test	All	"High" Score 27-44	"Low" Score 0-14	Diff.	Sigma of Diff.	Reliab. Index	Chances that Diff. is Rel.
Scholarship	45.77	51.91	44.21	7.70	2.95	2.61	99.5
Thorndike	81.41	83.19	82.24	.96	1.86	.51	69
Acomp. Index	.59	1.37	—1.45	2.82	2.37	1.19	88
Economic Status of Father	12.63	12.84	12.16	.68	.47	1.46	93
Age	18.60	18.70	18.89	.19	.40	.47	68
Time spent in[11]							
Soc. Recreation	2.54	2.58	2.57	.01	.24	.04	52
Exercise	1.93	1.75	2.00	.25	.15	1.61	95
Study	3.97	4.13	4.25	.12	.23	.52	70
Sleep	8.38	8.29	8.43	.14	.14	.96	83

[11] Hours per day.

the various measures for *all* subjects taking the Laird Test, for those making the highest scores on the Laird Test, for those making the lowest scores on the Laird Test, the difference between the two extreme groups, the sigma of the difference, the index of reliability of the difference, and the chances in one hundred that the difference is reliable.

Table XII shows the average Laird score made by all the subjects for whom there are scores on the various measures, the average Laird score for those making extremely low scores

TABLE XII

Average Laird Scores for the Various Measure Groups and for the Groups Making the Extreme Scores on Those Measures

Scholarship		*Thorndike*	
All	20.99	All	21.03
Score 56-111	22.68	Score 90-119	21.10
Score 0-35	20.52	Score 40-74	19.99
Difference	2.16	Difference	1.11
Sigma of Diff.	1.22	Sigma of Diff.	1.38
Reliability Index	1.77	Reliability Index	.80
Chances in 100	96	Chances in 100	79
Accomplishment Index		*Economic Status of Father*	
All	21.00	All	20.70
Score 10-44	21.93	Score 14-17	21.37
Score (—11)-(—45)	20.68	Score 3-10	19.74
Difference	1.25	Difference	1.62
Sigma of Diff.	1.35	Sigma of Diff.	1.37
Reliability Index	.92	Reliability Index	1.19
Chances in 100	82	Chances in 100	88
Age		*Time Spent in Social Recreation*	
All	21.07	All	21.40
Ages 20-28	22.03	Hrs. per day 4-9	21.39
Ages 15-16	23.72	Hrs. per day .5	22.60
Difference	1.69	Difference	1.21
Sigma of Diff.	1.68	Sigma of Diff.	2.37
Reliability Index	1.01	Reliability Index	.51
Chances in 100	84	Chances in 100	69
Time Spent in Exercise		*Time Spent in Study*	
All	21.00	All	21.02
Hrs. per day 3-4	22.07	Hrs. per day 5-8	21.15
Hrs. per day .5	23.01	Hrs. per day 1-2	21.65
Difference	.94	Difference	.50
Sigma of Diff.	1.96	Sigma of Diff.	1.39
Reliability Index	.48	Reliability Index	.36
Chances in 100	68	Chances in 100	64

Time Spent in Sleep

All	21.07
Hrs. per day 9-10	20.24
Hrs. per day 4-7	22.07
Difference	1.83
Sigma of Diff.	1.24
Reliability Index	1.46
Chances in 100	93

and extremely high scores on the various other measures, the difference between the Laird scores of these extreme groups, the sigma of the difference, and the chances in one hundred that the difference is reliable.

An examination of the two preceding tables (Tables XI and XII) shows that there is no conventionally reliable difference in the scores made on the various measures between those who make "high" scores on the Laird Test and those who make "low" scores on the Laird Test. However, the chances are ninety-nine and a half in one hundred that those in the "high" group on the Laird Test make better scholarship scores on the average than those in the "low" group on the Laird Test. The

TABLE XIII*

Percentages of the Laird Test Groups (Low, Middle, High) Falling Within the Classifications Indicated

	Laird 0-14	*Laird 15-26*	*Laird 27-44*	*Difference between High and Low Groups*
Membership in fraternity	9.2	17.5	11.2	+ 2.0[12]
Member of scholarship clubs in h. s., or receiver of scholastic honors	23.6	38.7	28.1	+ 4.5
Intellectual or artistic interests in h. s. (e.g., debate, orchestra), except scholarship clubs or honors; social clubs	60.5	69.3	70.4	+ 9.9
Athletic activity in h. s.	46.0	38.1	26.7	—19.3
Some extra-curricular activity in h. s., except scholarship clubs and honors	77.6	80.6	78.8	+ 1.2
Illness at college	7.8	18.2	19.4	+11.6
Recorded as well read	26.3	33.1	32.3	+ 6.0
Earns none	36.8	45.0	40.8	+ 4.0
Earns some	44.7	35.0	39.4	— 5.3
Earns most or all .	18.4	20.0	19.7	+ 1.3
Extra-curricular activity in college	30.2	26.2	38.0	+ 7.8
Warned by the dean; probation or special discipline	18.4	20.6	8.4	—10.0
Congratulations	13.1	13.7	28.1	+15.0
No warning; no probation; no discipline; no congratulations	68.4	65.6	63.3	— 5.1
Withdrew or dropped	6.5	12.5	8.4	+ 1.9
Over-cut classes	30.2	42.5	29.5	— 0.7

*Data on commuting are not included in this table, since only nine subjects were recorded as traveling more than one hour.

[12] The plus sign means that a larger percentage of the "high" Laird group falls within the given classifications; the minus sign that a larger percentage of the "low" Laird group falls within the given classifications.

chances are about ninety-five in one hundred that the "high" Laird group take less exercise than the "low" Laird group. The chances are ninety-three in one hundred that the "high" Laird group come from slightly higher economic ranks; but the difference is very slight and probably not significant due to the crudeness of the scale by which economic status of the father was determined.

And the chances are ninety-six in one hundred that those who make high scholarship records make on the average slightly higher scores on the Laird Test, than those whose scholarship in general is lower. The chances are ninety-three in one hundred that those who sleep but few hours a day make higher scores on the Laird test than those who sleep longer hours.

The data from the dean's office were then treated as in the case of the P D Sheet. The preceding table (Table XIII) shows the percentages of students in the middle group on the Laird Test, and the two extreme groups on the Laird Test that fall within the classifications indicated in the column to the left.

The average difference, regardless of sign, between the percentages of the "high" and "low" Laird groups that fall within the classifications given in the preceding table (Table XIII) is 6.6, and the sigma of the distribution is 5.1. Considering, therefore, those differences of some significance which are more than one sigma above the average, it would appear that a larger percentage of those who have low Laird scores participate in athletic activities at high school; and that a larger percentage of those with high Laird scores are ill at college; while a larger percentage of those with high Laird scores receive congratulations from the Dean for superior scholarship.

The result with respect to intellectual and artistic interests in high school, other than scholarship clubs or honors, is almost the reverse from that obtained with the P D Sheet. With the Laird Test a larger percentage with high scores show intellectual or artistic interests; while with the P D Sheet a larger percentage with low scores show such interests. With respect to congratulations from the dean results from the P D Sheet and from the Laird Test coincide; in both cases a larger percentage of those with high scores receive letters of congratulation for superior scholarship. With the P D Sheet the difference between the extreme groups with relation to illness at

college is not marked, while with the Laird Test over fifty per cent more in the "high" group have recorded illnesses than in the "low" group.

Now, if we take the fraternity group and the non-fraternity group, and so on down the list, and compare the average scores on the Laird Test made by the opposing groups, the differences and reliabilities of the differences appear in the following table. (Table XIV.)

TABLE XIV

Average Laird Scores Made by the Opposing Groups as Indicated, the Differences between the Averages and the Reliability of the Differences. The Average Laird Score of *All* Subjects is 21.00

	Av.	*Diff.*	*Sigma of Diff.*	*Index of Rel.*	*Chances that Diff. is Rel.*
Fraternity	21.24				
No fraternity	20.95	.29	1.21	.24	59
Scholarship club in h. s.	21.60				
No scholarship club in h. s.	22.37	.77	.91	.84	80
Intell. or art. int. in h. s.	21.24				
No intell. or art. int.	20.49	.75	.98	.77	78
Athletic activity in h. s.	19.71				
No athletic activity in h. s.	21.77	2.06	.95	2.18	98.5
Some extra-cur. act. in h. s.	21.02				
No extra-cur. act. in h. s.	20.88	.14	1.10	.13	55
Illness at college	23.23				
No illness at college	20.66	2.57	1.29	1.99	97.6
Well read	21.91				
Not well read	20.58	1.33	1.02	1.30	90
Earns none	21.27				
Earns some	20.54	.73	1.06	.68	75
Earns none	21.27				
Earns most or all	21.30	.03	1.22	.02	51
Extra-cur. act. at college	22.04				
No extra-cur. act. at college	20.55	1.49	1.07	1.40	92
Warning or probation	19.78				
No warning or probation, nor congratulations	20.75	.97	1.14	.85	80
Warning or probation	19.78				
Congratulations	23.19	3.41	1.61	2.12	98
Congratulations	23.19				
No warning or probation, nor congratulations	20.75	2.44	1.39	1.75	96
Withdrew or dropped	22.02				
Remained	20.88	1.14	1.60	.71	76
Over-cut classes	20.95				
No over-cut classes	21.02	.07	.93	.08	53

There appears to be no conventionally reliable difference between the average Laird scores made by the various opposing groups indicated in Table XIV. However, the chances are ninety-eight and a half in one hundred that those who engage in athletic activity in high school have a slightly lower average

score than those who do not participate in athletics. The chances are over ninety-seven in one hundred that those who are ill at college have a higher average Laird score than those who have no illness recorded. The chances are ninety in one hundred that the "well read" students have a slightly higher average Laird score than those who are not so recorded. The chances are ninety-two in one hundred that those who engage in some form of extra-curricular activity at college have a higher Laird score than those who do not participate. And the chances are ninety-eight and ninety-six in one hundred that those who receive congratulations from the dean make a higher average Laird score than those who are warned or put on probation and than those who receive no such attention from the dean's office.

It appears in general, then, that the superior student tends to have a slightly higher Laird score than the general run of students; that those who are ill at college tend to have slightly higher scores; while those who participate in athletic activities (in high school) tend to have lower scores.

If we take the fraternity group and the non-fraternity group, and so on down the list, and compare the distribution of scores made by the opposing groups, the percentages of over-

TABLE XV

Percentage of Overlapping on the Laird Test of the Opposing Groups as Indicated[13]

Fraternity, and no fraternity	50
Scholarship clubs and honors, and no scholarship clubs and honors in h. s.	45
Intellectual or artistic interests, and no intellectual or artistic interests in h. s.	53
Athletic activity, and no athletic activity in h. s.	40
Some extra-curricular activity, and no extra-curricular activity in h. s.	49
Illness at college, and no illness at college	59
Well read, and not well read	55
Earns none, and earns some	51
Earns none, and earns most or all	46
Extra-curricular activity at college, and no extra-curricular activity at college	55
Warning or probation, and no warning, probation, nor congratulations	49
Warning or probation, and congratulations	32
Congratulations, and no warning, probation, nor congratulations	58
Withdrew or dropped, and remained in college	54
Over-cut classes, and no over-cut classes	47

[13] The figures signify that the group first mentioned reaches or exceeds in the specified percentage of cases the average of the group mentioned second.

lapping of the distributions appear in the foregoing table. (Table XV.)

Taking fifty per cent of overlapping as complete coincidence of the compared distributions, the average deviation from complete coincidence of the groups compared is 5.1. The sigma of the distribution of deviations is 4.5. Considering, therefore, those overlappings of significance which deviate more than one sigma beyond the average and away from perfect coincidence, it appears that those who engage in athletics in high school, and those who are warned by the dean or are put on probation for poor scholarship tend to have lower scores on the Laird Test than those who do not participate in athletics in high school, or who receive congratulations for superior scholarship.

The general trend of the results with the Laird Test seems to indicate that there is a relation between low scores on the Laird Test and participation in athletics (in high school) ; and some relation between high scores on the Laird Test and superior scholarship in college.

Since there is a correlation of only .11 between scores on the Laird Test and scholarship, class marks can not be predicted from Laird scores. The apparent tendency toward superior scholarship of those who make high scores on the Laird Test is not due to their superior intelligence, since there is no correlation between Laird scores and the Thorndike examination, and since the "high" group on the Laird test have an average of only about one point more on the Thorndike examination than the "low" group on the Laird Test, while they make an average of almost eight points more on scholarship score. It is useless to figure partial or multiple correlations with the Laird Test, since all inter-correlations are very low. (Less than .20.)

As with the P D Sheet, the relations of Laird scores to exercise and athletics possibly indicates the hygienic value of physical exercise. And as with the P D Sheet, the relation of the high Laird scores to superior scholarship possibly indicates that some of the subjects are compensating for the presence of symptoms as reported in the Laird results by withdrawing from social and physical activities, and putting forth greater effort in the direction that, on the surface, seems to be the main business of college; or possibly the reverse (since causal rela-

tionship is not indicated)—that those who put forth great effort to achieve tend to become more "nervous."[14]

A comparison of the median score of Columbia freshmen (all men), and the medians given by Laird for both men and women in the manual of instructions for administering the tests is of some interest. The median for men given by Laird is 12; and the median for women is 19 plus. The median found for Columbia freshmen is also 19 plus and practically coincides with that given for women.

C. The X O Total Score

As with the two previous tests, the following table (Table XVI) shows no correlation between the X O Total score and any of the measures indicated.

TABLE XVI
Correlaton of X O Total Scores with

	r	*PE*		*r*	*PE*
Scholarship	.07	.04	Time Spent in		
Thorndike	—.07	.04	Soc. Recreation	.01	.04
Accomp. Index	.10	.04	Exercise	.08	.04
Economic Status of			Study	.08	.04
Father	—.08	.04	Sleep	—.01	.04
Age	—.08	.04			

The group was next divided and a comparison made between those approximately more than one probable error above the average and those approximately more than one probable error below the average.

The following table (Table XVII) shows the average score

TABLE XVII
Average Scores on the Various Measures Made by "High" and "Low" Groups on the X O Total Score

X O Total	All	"High" Score 195-314	"Low" Score 45-134	Diff.	Sigma of Diff.	Reliab. Index	Chances that Diff. is Rel.
Scholarship	45.80	47.95	43.91	4.04	3.21	1.26	90
Thorndike	81.40	81.99	82.11	.12	1.85	.07	53
Accomp. Index	1.03	.85	—1.43	2.29	2.31	.99	84
Economic Status of Father	12.62	12.25	12.77	.52	.49	1.07	86
Age	18.56	18.23	18.84	.61	.31	1.99	97.7
Time Spent in[15]							
Soc. Recreation	2.54	2.53	2.60	.07	.23	.27	61
Exercise	1.90	1.95	1.80	.15	.13	1.13	87
Study	4.08	4.21	3.90	.31	.20	1.54	94
Sleep	8.37	8.32	8.36	.04	.14	.25	60

[14] See also note, page 32.
[15] Hours per day.

on the various measures for *all* subjects taking the X O Test, for those making the highest X O Total scores, for those making the lowest X O Total scores, the difference between these two extremes, the sigma of the difference, the index of reliability, and the chances in one hundred that the difference is reliable.

The next table (Table XVIII) shows the average X O Total score made by all the subjects for whom there are scores on the various measures, the average X O Total score for those

TABLE XVIII

Average X O Total Scores for the Various Measure Groups and for the Groups Making the Extreme Scores on Those Measures

Scholarship		*Thorndike*	
All	165.27	All	166.53
Score 56-111	171.66	Score 90-119	157.24
Score 10-35	159.53	Score 40-74	165.09
Difference	12.13	Difference	7.85
Sigma of Diff.	7.54	Sigma of Diff.	8.64
Reliability Index	1.61	Reliability Index	.91
Chances in 100	95	Chances in 100	82
Accomplishment Index		*Economic Status of Father*	
All	165.52	All	166.53
Score 10-44	171.57	Score 14-17	164.24
Score (—11)-(—45)	154.64	Score 3-10	168.15
Difference	16.93	Difference	3.91
Sigma of Diff.	8.57	Sigma of Diff.	8.70
Reliability Index	1.98	Reliability Index	.45
Chances in 100	97.6	Chances in 100	67
Age		*Time Spent in Social Recreation*	
All	166.21	All	167.27
Age 20-28	162.70	Hrs. per day 4-9	168.95
Age 15-16	179.69	Hrs. per day .5	162.34
Difference	16.99	Difference	6.61
Sigma of Diff.	10.09	Sigma of Diff.	10.75
Reliability Index	1.68	Reliability Index	.61
Chances in 100	95	Chances in 100	73
Time Spent in Exercise		*Time Spent in Study*	
All	166.82	All	166.64
Hrs. per day 3-4	174.77	Hrs. per day 5-8	172.71
Hrs. per day .5	157.50	Hrs. per day 1-2	157.92
Difference	17.27	Difference	14.79
Sigma of Diff.	12.74	Sigma of Diff.	8.86
Reliability Index	1.36	Reliability Index	1.67
Chances in 100	91	Chances in 100	95

Time Spent in Sleep	
All	166.62
Hrs. per day 9-10	171.49
Hrs. per day 4-7	173.28
Difference	1.79
Sigma of Diff.	7.67
Reliability Index	.23
Chances in 100	59

making extremely low scores and extremely high scores on the various other measures, the difference between the X O Total scores of these extreme groups, the sigma of the difference, the index of reliability, and the chances in one hundred that the difference is reliable.

An examination of Table XVII shows that there is no conventionally reliable difference between the average scores made on the various measures by the "high" X O Total group and the "low" X O Total group. However, the chances are ninety in one hundred that the "high" X O Total group makes a better average scholarship score than the "low" X O Total group. The chances are over ninety-seven in one hundred that the "high" X O Total group is slightly younger—by about a half year—than the "low" X O Total group. The chances are ninety-four in one hundred that the "high" X O Total group studies more than the "low" X O Total group.

If it be assumed, or argued from the nature of the X O Total score, that this score is a measure of emotional reactivity, then it might be concluded that older freshmen tend to be less emotional than the younger ones; and that high emotional reactivity, as represented by a high X O Total score, acts as a drive to greater hours of study and to superior scholarship, or conversely, that more time spent in study increases emotional reactivity.[16] At best, however, there is a bare tendency, since the correlations between the X O Total score and the various measures are all less than .10.

An examination of Table XVIII likewise shows no conventionally reliable difference of average X O Total scores for the extreme groups on the various measures. It is noteworthy, however, that the chances are ninety-five in one hundred that the high scholarship group has a higher X O Total score than the low scholarship group; that there are more than ninety-seven chances in one hundred that those with high accomplishment indices have a higher average X O Total score than those with low indices; that the chances are ninety-five in one hundred that the younger students have higher X O Total scores than the older; that the chances are ninety-one in one hundred that those who spend much time in exercise have higher X O Total scores than those who spend little time in exercise; and that the chances are ninety-five in one hundred that those who

[16] See also note, page 32.

spend most time in study have higher X O Total scores than those who spend little time in study.

From the tendencies indicated it would appear again that high X O Total scores either represent at least a tendency to greater drive; or a tendency for the "better students" to become more "emotional" or "nervous."

The data from the dean's office were next treated as before. The next table (Table XIX) shows the percentages of students in the middle group in the X O Total score, and in the two extreme groups that fall within the classifications indicated in the column to the left.

TABLE XIX*

Percentages of the X O Total Groups (Low, Middle, High) Falling within the Classifications Indicated

	X O Total 45-134	*X O Total 135-194*	*X O Total 195-314*	*Difference between High and Low Groups*
Membership in fraternity	20.0	10.9	14.4	— 5.6[17]
Member of scholarship clubs in h. s., or receiver of scholastic honors	21.3	34.2	40.2	+18.9
Intellectual or artistic interests in h. s. (e.g., debate, orchestra), except scholarship clubs or honors; social clubs	69.3	65.7	69.5	+ 0.2
Athletic activity in h. s.	37.3	39.7	35.3	— 2.0
Some extra-curricular activity in h. s., except scholarship clubs and honors	80.0	79.4	80.4	+ 0.4
Illness at college	10.6	18.4	17.0	+ 6.4
Recorded as well read	33.3	29.4	34.1	+ 0.8
Earns none	46.6	41.8	35.3	—11.3
Earns some	38.6	37.6	41.4	+ 2.8
Earns most or all	14.6	20.5	23.1	+ 8.5
Extra-curricular activity in college	28.0	26.0	39.0	+11.0
Warned by the dean; probation; or special discipline	18.6	17.8	14.6	— 4.0
Congratulations	14.6	17.1	19.5	+ 4.9
No warning; no probation; no discipline; no congratulations	66.6	65.0	65.8	— 0.8
Withdrew or dropped	10.6	10.9	7.3	— 3.3
Over-cut classes	44.0	32.1	36.5	— 7.5

*Data on commuting are not included in this table since only nine subjects were recorded as traveling more than one hour.

[17] The plus sign means that a larger percentage of the "high" X O Total group falls within the given classifications; the minus sign that a larger percentage of the "low" X O Total group falls within the given ifications.

The average difference, regardless of sign, between the percentages of the "high" and "low" X O Total groups that fall within the classifications given in the preceding table (Table XIX) is 5.6; and the sigma of the distribution is 4.9. Considering, therefore, those differences of some significance which are more than one sigma above the average, it would appear that a larger percentage of those with "high" X O Total scores than of those with "low" scores are members of high school scholarship clubs, or receive scholastic honors; that a larger percentage of the "low" X O Total group than the "high" X O Total group earn nothing; and that a larger percentage of the "high" X O Total group engage in extra-curricular activities at college.

TABLE XX

Average X O Total Scores Made by the Opposing Groups as Indicated, the Differences Between the Averages and the Reliability of the Differences. The Average X O Total Score of *All* Subjects is 165.52

	Av.	*Diff.*	*Sigma of Diff.*	*Index of Rel.*	*Chances that Diff. is Rel.*
Fraternity	160.29				
No fraternity	166.58	6.29	8.67	.73	77
Scholarship club in h. s.	177.80				
No scholarship club in h. s.	159.56	18.24	6.03	3.02	100
Intell. or art. int. in h. s.	166.13				
No intell. or art. int.	164.23	1.90	6.18	.31	62
Athletic activity in h. s.	166.89				
No athletic act. in h. s.	164.68	2.21	6.20	.36	64
Some extra-cur. act. in h. s.	165.87				
No extra-cur. act. in h. s.	164.14	1.73	7.25	.24	59
Illness at college	171.89				
No illness at college	164.29	7.60	6.66	1.14	87
Well read	165.16				
Not well read	165.69	.53	6.16	.09	54
Earns none	159.78				
Earns some	168.05	8.27	6.49	1.27	90
Earns none	159.78				
Earns most or all	172.50	12.72	7.98	1.59	94
Extra-cur. act. at college	173.82				
No extra-cur. act. at college	161.96	11.86	7.06	1.68	95
Warning or probation	165.29				
No warning, probation, nor congratulations	164.51	.78	7.99	.09	54
Warning or probation	165.29				
Congratulations	169.61	4.32	9.94	1.20	88
Congratulations	169.61				
No warning, probation, nor congratulations	164.51	5.10	7.78	.65	74
Withdrew or dropped	165.50				
Remained	165.52	.02	8.92	.002	50
Over-cut classes	162.68				
No over-cut classes	167.14	4.46	6.05	.74	77

Now, if we take the fraternity group and the non-fraternity group, and so on down the list, and compare the average X O Total scores made by the opposing groups, the differences and reliabilities of the differences appear in the foregoing table. (Table XX.)

There is a conventionally reliable difference between those who belong to scholarship clubs in high school or receive scholastic honors, and those who do not belong to such clubs or receive such honors. Those so distinguished for scholarship make an X O Total score more than eighteen points higher than the others. Other than this one case there appears to be no conventionally reliable difference in X O Total scores made by the various opposing groups. There are, however, ninety chances in one hundred that those who earn some of their way through college have a higher average X O Total score than those who earn none of it, and ninety-four chances in one hundred that those who earn most or all of their expenses have a higher score. The chances are ninety-five in one hundred that those who participate in extra-curricular activities in college have a higher average X O Total score than those who do not so participate.

If we take the fraternity group and the non-fraternity group, and so on down the list, and compare the distribution of scores made by the opposing groups, the percentages of overlapping of the distributions appear in the following table. (Table XXI.)

Taking fifty per cent of overlapping as complete coincidence of the compared distributions, the average deviation from complete coincidence of the groups compared is 5.4 per cent. The sigma of the distribution of deviations is 4.9. Considering, therefore, those overlappings of some significance which deviate more than one sigma beyond the average and away from perfect coincidence, it appears that those who belong to fraternities in college tend to have lower X O Total scores than those who do not belong to fraternities; and that those who belong to scholarship clubs in high school or receive scholastic honors in high school tend to have higher X O Total scores than those who do not so distinguish themselves in scholarship in high school.

Just why fraternity men should tend to have lower X O Total scores than non-fraternity men, it is difficult to explain, unless it is assumed that the X O Total score represents emo-

TABLE XXI

Percentage of Overlapping on the X O Total Score of the Opposing Groups as Indicated[18]

Fraternity, and no fraternity	39
Scholarship clubs and honors, and no scholarship clubs and honors in h. s.	67
Intellectual or artistic interests, and no intellectual or artistic interests in h. s.	53
Athletic activity, and no athletic activity in h. s.	50
Some extra-curricular activity, and no extra-curricular activity in h. s.	52
Illness at college, and no illness at college	56
Well read, and not well read	52
Earns none, and earns some	47
Earns none, and earns most or all	43
Extra-curricular activity at college, and no extra-curricular activity at college	58
Warning or probation, and no warning, probation, nor congratulations	47
Warning or probation, and congratulations	43
Congratulations, and no warning, probation, nor congratulations	58
Withdrew or dropped, and remained in college	53
Over-cut classes, and no over-cut classes	49

tional reactivity and that those who are facile in emotional reaction do not fit well into a closely associated group life.

In general it appears that those with high X O Total scores show greater activity toward individual accomplishment as indicated by membership in scholarship clubs in high school, acquisition of scholastic honors in high school, and by participation in extra-curricular activities in college. If it be assumed that membership in a college fraternity represents a community life, those who make high X O Total scores tend toward more individual lives.

The evidence, however, shows merely a tendency. It is impossible to predict behavior on the basis of X O Total scores, since all correlations are close to zero, since differences in averages of groups are for the most part very small and not generally conventionally reliable. Multiple and partial correlations have not been figured because all inter-correlations are very small and promise nothing significant.

Pressey, in the sheet of instructions accompanying the test, gives the median total score for 58 women and 56 men as 230; whereas the median score for the Columbia freshmen is 168.5 —decidedly lower than that given by the author of the test. The discrepancy probably is due to the fact that Pressey's fig-

[18] The figures signify that the group first mentioned reaches or exceeds in the specified percentage of cases the average of the group mentioned second.

ure includes both men and women, and that women probably would have higher scores than men.

D. The X O Deviation Score

The correlations between the X O Deviation scores and other measures are given in the following table. (Table XXII.)

TABLE XXII
Correlation of the X O Deviation Score with

	r	*PE*		*r*	*PE*
Scholarship	—.01	.04	Time spent in		
Thorndike	.07	.04	Soc. Recreation	—.02	.04
Accomp. Index	—.07	.04	Exercise	.03	.04
Economic Status			Study	—.01	.04
of Father	.01	.04	Sleep	.04	.04
Age	—.07	.04			

There is no correlation between X O Deviation scores and any of the measures indicated.

The group was then divided so as to compare the two extremes, by taking those approximately more than one probable error above the average and those approximately more than one probable error below the average.

The following table (Table XXIII) shows the average score on the various measures for *all* subjects taking the X O Test, for those making the highest Deviation scores, for those making the lowest Deviation scores, the difference between these two extremes, the sigma of the difference, the index of reliability of the difference, and the chances in one hundred that the difference is reliable.

TABLE XXIII
Average Scores on the Various Measures Made by "High" and "Low" X O Deviation Score Groups

X O Deviation	All	"High" Score 51-65	"Low" Score 27-41	Diff.	Sigma of Diff.	Reliab. Index	Chances that Diff. is Rel.
Scholarship	45.72	44.23	44.68	.45	3.11	.15	56
Thorndike	81.63	83.01	81.27	1.74	1.67	1.05	85
Accomp. Index	.61	—1.59	.68	2.27	2.28	1.00	84
Economic Status of Father	12.66	12.45	12.48	.04	.47	.08	53
Age	18.52	18.40	18.62	.22	.31	.70	76
Time spent in[19]							
Soc. Recreation	2.54	2.64	2.58	.06	.22	.29	61
Exercise	1.90	1.91	1.89	.02	.15	.13	55
Study	4.04	3.99	3.99	.00	.23	.00	50
Sleep	8.38	8.43	8.34	.09	.14	.63	74

[19] Hours per day.

This table (Table XXIII) shows no reliable differences, nor any "near-reliable" differences between the average scores on the various measures of the "high" and "low" X O Deviation score groups.

The next table (Table XXIV) shows the average X O Deviation score made by all the subjects for whom there are scores on the various measures, the average X O Deviation score for those making extremely low scores and extremely high scores on the various measures, the difference between the X O Devia-

TABLE XXIV

Average X O Deviation Scores for the Various Measure Groups and for the Groups Making the Extreme Scores on Those Measures

Scholarship		*Thorndike*	
All	46.10	All	46.23
Score 56-111	46.50	Score 90-119	46.24
Score 0-35	46.17	Score 40-74	45.39
Difference	.33	Difference	.85
Sigma of Diff.	1.03	Sigma of Diff.	1.19
Reliability Index	.32	Reliability Index	.71
Chances in 100	53	Chances in 100	76
Accomplishment Index		*Economic Status of Father*	
All	46.13	All	46.31
Score 10-44	44.90	Score 14-17	47.23
Score (—11)-(—45)	46.98	Score 3-10	46.40
Difference	2.08	Difference	.83
Sigma of Diff.	1.19	Sigma of Diff.	1.03
Reliability Index	1.75	Reliability Index	.81
Chances in 100	96	Chances in 100	79
Age		*Time Spent in Social Recreation*	
All	46.39	All	46.39
Age 20-28	44.93	Hrs. per day 4-9	46.50
Age 15-16	46.83	Hrs. per day .5	46.40
Difference	1.90	Difference	.10
Sigma of Diff.	1.42	Sigma of Diff.	1.46
Reliability Index	1.33	Reliability Index	.07
Chances in 100	91	Chances in 100	53
Time Spent in Exercise		*Time Spent in Study*	
All	46.48	All	46.46
Hrs. per day 3-4	47.53	Hrs. per day 5-8	46.60
Hrs. per day .5	47.78	Hrs. per day 1-2	47.19
Difference	.25	Difference	.59
Sigma of Diff.	1.54	Sigma of Diff.	1.25
Reliability Index	.16	Reliability Index	.47
Chances in 100	56	Chances in 100	68

Time Spent in Sleep

All	46.44
Hrs. per day 9-10	46.37
Hrs. per day 4-7	45.97
Difference	.40
Sigma of Diff.	1.07
Reliability Index	.38
Chances in 100	65

tion score of these extreme groups, the sigma of the difference, the index of reliability, and the chances in one hundred that the difference is reliable.

An examination of the preceding table (Table XXIV) shows that there is no conventionally reliable difference in average X O Deviation scores made by the "high" and "low" groups on the other measures. But the chances are ninety-six in one hundred that those having low, or negative accomplishment indices make slightly higher X O Deviation scores. The chances are ninety-one in one hundred that the younger students have slightly higher X O Deviation scores than the older ones.

By the method used in securing the Deviation score, it is supposed to represent the amount that an individual departs from the mode of emotional reactions. It would then appear that there is a tendency for those who accomplish least in their classes, when their intelligence is considered as a factor, to depart most from the mode of emotional reactions. However, the accomplishment can not be predicted on the basis of the Deviation score since the correlation between these two measures is only —.07.

Similarly it would appear that the younger students tend to deviate most from the mode of emotional reactions. This is a tendency more or less to be expected, since younger persons have not been subject to social disapproval of their deviations for as long a time as the older persons.[20] The older persons have had more opportunity, or even more necessity to conform to modal standards. Furthermore, it is only a bare tendency that is indicated upon which nothing can be predicted, since the correlation between age and Deviation score is only —.07.

Before any definite conclusions are drawn from the results with the X O Deviation score, and even before any tendencies manifested are considered of any significance it must be remembered that the reliability coefficient of the Deviation score is but .50 with a probable error of .03.

Data from the dean's office were next used and the following table (Table XXV) compiled, showing the percentages of students in the middle group of X O Deviation scores, and in the

[20] Chambers (11) devised a differential score which showed a change from grade to grade; however, his results cannot be compared with the present results, since his differential score was determined by a different method. (See page 16.)

TABLE XXV*

Percentages of the X O Deviation Groups (Low, Middle, High) Falling within the Classifications Indicated

	X O Dev. 27-41	*X O Dev. 42-50*	*X O Dev. 51-65*	*Difference between High and Low Groups*
Membership in fraternity	12.9	15.1	15.1	+ 2.2[21]
Member of scholarship clubs in h. s., or receiver of scholastic honors	35.8	35.1	21.2	—14.6
Intellectual or artistic interests in h. s. (e.g., debate, orchestra), except scholarship clubs or honors; social clubs	68.8	68.2	69.6	+ 0.8
Athletic activity in h. s.	28.5	38.6	43.9	+15.4
Some extra-curricular activity in h. s., except scholarship clubs or honors	75.3	80.6	81.8	+ 6.5
Illness at college	12.9	16.5	16.6	+ 3.7
Recorded as well read	28.5	30.3	37.8	+ 9.3
Earns none	40.2	42.0	36.3	— 3.9
Earns some	36.3	40.0	40.9	+ 4.6
Earns most or all	23.3	17.9	22.7	+ 0.6
Extra-curricular activity in college	32.4	28.2	34.8	+ 2.4
Warned by the dean; probation; or special discipline	15.5	17.2	21.2	+ 5.7
Congratulations	11.6	21.3	16.6	+ 5.0
No warning; no probation; no discipline; no congratulations	72.7	61.3	62.1	—10.6
Withdrew or dropped	6.4	8.9	15.1	+ 8.7
Over-cut classes	32.4	33.1	46.9	+14.5

*Data on commuting are not included in this table since only nine subjects were recorded as traveling more than one hour.

two extreme groups of X O Deviation scores that fall within the classifications indicated in the column to the left.

The average difference, regardless of sign, between the percentages of the "high" and "low" X O Deviation groups that fall within the classifications given in the preceding table (Table XXV) is 6.8, and the sigma of the distribution is 4.8. Considering, therefore, those differences of some significance which are more than one sigma above the average, it would appear that a larger percentage of those with "low" X O Deviation scores are members of scholarship clubs or receive scholastic honors in high school; that a larger percentage of

[21] The plus sign means that a larger percentage of the "high" X O Deviation group falls within the given classifications; the minus sign that a larger percentage of the "low" X O Deviation group falls within the given classifications.

those making "high" X O Deviation scores participate in athletics in high school; and that a larger percentage of those making "high" X O Deviation scores over-cut classes in college. Although the difference is not more than one sigma above the average difference, it is high enough to make special note of the difference of 10.6 between the "high" and "low" X O Deviation groups with respect to attention from the dean. A larger percentage of those with "low" X O Deviation scores do not draw the attention of the dean either in the way of warning, probation, special discipline, or a letter of congratulations for superior scholarship.

The evidence from this table seems to show that the X O Deviation score indicates those students who in some way

TABLE XXVI

Average X O Deviation Scores Made by the Opposing Groups as Indicated, the Differences Between the Averages and the Reliability of the Differences. The Average X O Deviation Score of *All* Subjects is 46.13

	Av.	*Diff.*	*Sigma of Diff.*	*Index of Rel.*	*Chances that Diff. is Rel.*
Fraternity	46.50				
No fraternity	46.06	.44	1.15	.38	65
Scholarship club in h. s.	45.63				
No scholarship club in h. s.	46.33	.70	.79	.89	81
Intell. or art. int. in h. s.	46.55				
No intell. or art. int.	45.53	1.02	.83	1.22	89
Athletic activity in h. s.	46.72				
No athletic activity in h. s.	45.60	1.12	.81	1.38	92
Some extra-cur. act. in h. s.	46.53				
No extra-cur. act. in h. s.	44.57	1.96	.97	2.02	98
Illness at college	46.43				
No illness at college	45.57	.86	1.05	.82	79
Well read	46.53				
Not well read	45.94	.59	.87	.68	75
Earns none	46.09				
Earns some	46.61	.52	.87	.60	73
Earns none	46.09				
Earns most or all	45.28	.81	1.11	.73	77
Extra-cur. act. at college	46.60				
No extra-cur. act. at college	45.93	.67	.88	.77	80
Warning or probation	47.15				
No warning, probation, nor congratulations	45.69	1.46	1.02	1.43	92
Warning or probation	47.15				
Congratulations	46.68	.47	1.20	.39	65
Congratulations	46.68				
No warning, probation, nor congratulations	45.69	.98	.97	1.01	84
Withdrew or dropped	47.79				
Remained	45.95	1.84	1.34	1.38	92
Over-cut classes	47.05				
No over-cut classes	45.60	1.45	.85	1.70	96

(some students in one way and some in another) show tendencies toward non-conformity to group standards of conduct. Those with high X O Deviation scores seem to tend toward greater activity in either athletics or scholarship, and by over-cutting classes show a disregard for the established routine.

Now, if we take the fraternity group and the non-fraternity group, and so on down the list, and compare the average X O Deviation scores made by the opposing groups, the differences and reliabilities of the differences appear in the table on page 52. (Table XXVI.)

There appears to be no conventionally reliable difference between the average X O Deviation score made by the various opposing groups indicated in Table XXVI. However, the chances are ninety-two in one hundred that those who engage in athletic activity in high school have a slightly higher average X O Deviation score than those who do not engage in athletic activity in high school; and ninety-eight in one hundred (almost certainty) that those who engage in some kind of extra-curricular activity, exclusive of membership in scholarship clubs, have a higher average X O Deviation score by about two points than those who do not participate in such extra-curric-

TABLE XXVII

Percentage of Overlapping of X O Deviation Scores of the Opposing Groups as Indicated[22]

Fraternity and no fraternity	50
Scholarship clubs and honors, and no scholarship clubs and honors in h. s.	46
Intellectual or artistic interests, and no intellectual or artistic interests in h. s.	51
Athletic activity, and no athletic activity in h. s.	53
Some extra-curricular activity, and no extra-curricular activity in h. s.	57
Illness at college, and no illness at college	46
Well read, and not well read	48
Earns none, and earns some	49
Earns none, and earns most or all	58
Extra-curricular activity at college, and no extra-curricular activity at college	51
Warning or probation, and no warning, probation, nor congratulations	61
Warning or probation, and congratulations	55
Congratulations, and no warning, probation, nor congratulations	50
Withdrew or dropped, and continued in college	58
Over-cut classes, and no over-cut classes	52

[22] The figures signify that the group first mentioned reaches or exceeds in the specified percentage of cases the average of the group mentioned second.

ular activities. The chances are ninety-two in one hundred that those who receive warning from the dean or are put on probation have a higher X O Deviation score than those who are not warned, are not put on probation, nor receive congratulations for superior scholarship. The chances are also ninety-two in one hundred that those who withdraw or are dropped from college have a higher average X O Deviation score than those who continue their academic course.

If we take the fraternity group and the non-fraternity group, and so on down the list, and compare the distribution of scores made by the opposing groups, the percentages of overlapping of the distributions appear in the preceding table. (Table XXVII.)

Taking fifty per cent of overlapping as complete coincidence of the compared distributions, the average deviation from complete coincidence of the groups compared is 3.8 per cent. The sigma of the distribution of deviations is 3.2. Considering, therefore, those overlappings of significance which deviate more than one sigma beyond the average and away from perfect coincidence, it appears that those who participate in some kind of extra-curricular activities in high school, except scholarship clubs, tend to make higher X O Deviation scores than those who do not so participate; that those who earn nothing tend to make higher X O Deviation scores than those who earn most or all; that those who are warned by the dean or are put on probation for poor scholarship or other reasons tend to make higher X O Deviation scores than those who do not fall within that class; and that those who withdraw or are dropped from college tend to make higher X O Deviation scores than those who continue their academic work.

Combining the "significant" differences found in the preceding analysis it would seem that there is some relation between high X O Deviation scores and participation in extra-curricular activities in high school, except scholarship clubs; between high scores and either favorable or unfavorable attention from the dean's office; and between high scores and withdrawal from college and over-cutting classes.

In all cases differences are slight, overlapping great, and correlations nearly nothing, so that prediction of behavior on the basis of X O Deviation scores is not possible. It also appears that the reliability of the Deviation score is not very satisfactory, being represented by a self-correlation of only .50.

The median deviation score given by Pressey in the sheet of instructions accompanying the test is 47.2; the median deviation score of the Columbia freshmen is practically the same, being 46.

CHAPTER VI

SUMMARY

With none of the three tests, and the four scores obtained, are the correlations with other measures significantly high. Prediction of behavior, within the range of activities examined, is not possible from the scores obtained on any of the tests.

A study of the groups making "high" scores and of the groups making "low" scores on the various measures, and of various groups classified according to other information secured which could not be treated by numerical categories reveals only two conventionally reliable differences between the "high" and "low" groups. That third making the highest P D scores take less sleep by three and a half hours per week than the third making the lowest P D scores. Members of scholarship clubs and those receiving scholastic honors in high school make a higher average X O Total score by eighteen points than those not falling within that group. However, the various methods of comparison used indicate that there are certain other tendencies toward relationships of some significance.

The following table (Table XXVIII) shows the various measures and classifications used in this study, and opposite each the test or tests that seem to show a tendency toward some significant association, either positive or negative. A fairly consistent picture for studious activity appears, if we leave out of account the Deviation score. The associations are all positive. The fact that in most of the cases the Deviation score shows negative association points to the possible value of the Deviation score in a direction opposed to the other scores. However, the Deviation score is the least reliable of them all, the coefficient of reliability being only .50.

With *Motor Activity* there is general agreement between the P D Sheet and the Laird Test in favor of negative association; and the same is true with sleep.

In the case of *Social Activity* there is no such general agreement—possibly due to the fact that under "extra-curricular activities in college" were included "intellectual pursuits,"

TABLE XXVIII[23]

Apparent Association—Positive or Negative

	P D Sheet		*Laird*		*X O Total*		*X O Dev.*	
Age	+	+			—	—	—	
Studious Activity								
Scholarship			+	+	+	+		
Accomp. Index						+	+	
Study time	+	+			+	+		
H. S. Schol. Club		+			+	+	—	
Well read				+				
Warning and Prob.				+			—	
Congratulations	+	+		+	+			
Dropped							—	
Over-cut classes							—	—
Social Activity								
Time in Soc. Rec.		—						
Fraternity								
H. S. Clubs	—	—						
Extra-cur. act. in college		—		+	+	+		
Motor Activity								
Time in Exercise	—	—		—	+			
H. S. Athletics	—		—	—			+	+
Sleep	—	—	—					
Work, etc.								
Earning					+	+		
Commuting	—							
Illness in College			+	+				

such as the college publications, together with sports. This lumping of the two classes was necessary because of the relatively few freshmen who had participated in such activities.

The P D Sheet shows positive association with studious activities, and negative association with social and motor activities and with sleep. The Laird Test shows positive association with studious activities and negative association with motor activity and sleep. The X O Total score shows positive associations where it shows any, except with respect to age.

[23] The plus sign indicates a positive association, the minus sign a negative association. Under the general heading of *Scholarship*, for example, the plus sign means an association between high scores on the P D Sheet, etc., and the condition indicative of good scholarship, such as; —more time spent in study, *not* over-cut, *not* warned, *not* dropped. In making this table overlapping was not considered. Where two signs appear the association was apparent both ways; for example—those who have the highest P D scores (about the highest third) receive a larger percentage of congratulations than those who have the lowest P D scores (about the lowest third); and those who receive congratulations have a higher average P D score than those who do not receive congratulations. Where the difference is apparent only in one direction but one sign appears. Where there is no sign there was no apparent "significant" association.

The Deviation score is generally negatively associated with studious activities, and positively with high school athletics.

Presumably the P D Sheet and the Laird Test measure the same thing, since the Laird Test was based directly upon the P D Sheet. It is impossible from this study to determine to what extent they do measure the same thing since different subjects were used for each of these two tests. However, the relations that appear between these two tests and the other data coincide fairly well, with one exception. Participation in extra-curricular activities in college seems to indicate a tendency to a low P D score, but, on the other hand, it seems to indicate a tendency toward a high Laird score. Since the tendencies shown are in any case very slight, this discrepancy probably is of no real significance.[24]

The Laird Test and the X O Total score evidently do not measure the same things, since the correlation between scores on these tests is only .23, plus or minus .04, and when corrected for attenuation becomes .266.

The Laird Test and the X O Deviation score correlate to the extent of only .16, plus or minus .04, so obviously do not measure the same thing.

Neither do the X O Total score and the X O Deviation score measure the same thing since the correlation between these measures is only .05, plus or minus .04.

[24] It is possible that this discrepancy may be due to the answers to questions not common to both tests; or to the greater choice of answers permitted in the Laird Test.

BIBLIOGRAPHY

1. ANONYMOUS. Mental Hygiene and the College Student—Twenty Years After. *Mental Hygiene*, 1921, *5*, 736-740.
2. BARKER, L. F. Psychiatry and Public Health. *American Journal of Psychiatry*, 1924, *4*, 13-27.
3. BINGHAM, ANNE T. The Application of Psychiatry to High School Problems. *Mental Hygiene*, 1925, *9*, 1-27.
4. BLANTON, SMILEY. A Mental Hygiene Program for Colleges. *Mental Hygiene*, 1925, *9*, 478-488.
5. BLUMGART, LEONARD. Observations on Maladjusted Children. *Mental Hygiene*, 1921, *5*, 327-341.
6. BOND, H. M. An Investigation of Non-Intellectual Traits of a Group of Negro Adults. *Journal of Abnormal and Social Psychology*, 1926, *21*, 267-276.
7. BRIDGES, J. W. Emotional Instability of College Students. *Journal of Abnormal and Social Psychology*, 1927, *22*, 227-234.
8. BRIDGES, J. W. and BRIDGES, K. M. BANHAM. A Psychological Study of Juvenile Delinquency by Group Methods. *General Psychol. Monograph*, 1926, *1*, 411-506.
9. CADY, VERNON M. The Estimation of Juvenile Incorrigibility. *Journal of Delinquency Monograph*, 1923, *2*.
10. CHAMBERS, OTHNIEL R. Character Trait Tests and the Prognosis of College Achievement. *Journal of Abnormal and Social Psychology*, 1925, *20*, 303-311.
11. CHAMBERS, OTHNIEL R. A Method of Measuring the Emotional Maturity of Children. *The Ped. Sem. and Journal of Genetic Psychology*, 1925, *32*, 637-647.
12. CLEM, O. M. Detailed Factors in Latin Prognosis. Teachers College Contributions to Education, No. 144, 1924.
13. COBB, STANLEY. A Report on the Brief Neuropsychiatric Examination of 1,141 Students. *The Journal of Industrial Hygiene*, 1922, *3*, 309-315.
14. CRAIG, SIR MAURICE. Some Aspects of Education and Training in Relation to Mental Disorder. *Mental Hygiene*, 1923, *7*, 225-249.
15. EDITORIAL in *The Journal of Abnormal and Social Psychology*, 1925, *20*, 227.
16. EVERETT, EDITH M. Tests of Emotional Stability as Applied to High School Students. M. A. Thesis, Columbia, 1919.
17. FLEMMING, CECILE WHITE. A Detailed Analysis of Achievement in the High School. Teachers College Contributions to Education, No. 196, 1925.
18. FLEMMING, EDWIN G. and FLEMMING, CECILE WHITE. The Validity of the Mathews Revision of the Woodworth Personal Data Questionnaire. Unpublished.
19. FRANZ, SHEPHERD IVORY. Handbook of Mental Examination Methods. Sec. Ed., N. Y.: Macmillan, 1919, Chap. XII.
20. GARRETT, H. E. and SCHNECK, M. R. A Study of the Woodworth Personal Data Sheet. *Journal of General Psychology*, April, 1928, *1*.
21. HARTSHORNE, HUGH and MAY, MARK A. Objective Methods of Measuring Character. *Ped. Sem. and Journal of Genetic Psychology*, 1925, *32*, 45-67.
22. HAWKES, HERBERT E. Why Boys Fail in College. *New York Herald Tribune Magazine*, Oct. 3, 1926.
23. HOITSMA, RALPH K. The Reliability and Relationships of the Colgate Mental Hygiene Test. *Journal of Applied Psychology*, 1925, *9*, 293-303.
24. HOLLINGWORTH, H. L. The Psychology of Functional Neuroses. N. Y.: D. Appleton and Co., 1920.
25. HOUSE, S. DANIEL. A Mental Hygiene Inventory. *Archives of Psychology*, 88, 1927.

26. JOHNSON, BUDFORD. Emotional Stability in Children. *Ungraded*, 1920, *5*, 73-79.
27. KERNS, MAJOR HARRY N. Management of Acute Mental Hygiene Problems Found among College Men. *Mental Hygiene*, 1925, *7*, 273-281.
28. LAIRD, DONALD A. Case Studies in the Mental Problems of Later Adolescence with Special Reference to the Mental Hygiene of the College Student. *Mental Hygiene*, 1923, *7*, 715-733.
29. LAIRD, DONALD A. Detecting Abnormal Behavior. *Journal of Abnormal and Social Psychology*, 1925, *20*, 128-141.
30. LAIRD, DONALD A. Does There Exist a Need for a Program of Education in Mental Hygiene? *Mental Hygiene*, 1920, *4*, 393-403.
31. LAIRD, DONALD A. How Personalities are Found in Industry. *Industrial Psychology*, 1926, *1*, 654-662.
32. LAIRD, DONALD A. A Mental Hygiene and Vocational Test. *Journal of Educational Psychology*, 1925, *16*, 419-492.
33. LAIRD, DONALD A. Sex Indulgence and Psychoneurotic Tendencies in Middle Adolescence. *Psychoanalytic Review*, 1926, *13*, 496-498.
34. LAIRD, DONALD A. What the State Demands of its Sentinels of Mental Health. *Medical Record*, 1921, *100*, 500-507.
35. LAIRD, DONALD A. and MCCLUMPHA, THOMAS. Sex Differences in Emotional Outlets. *Science*, 1925, *62*, 292.
36. LANDIS, C., GULLETTE, R. and JACOBSEN, C. Criteria of Emotionality. *Ped. Sem. and Journal of Genetic Psychology*, 1925, *32*, 209-234.
37. LIU, H. C. Intelligence Non-Verbal Tests for Use in China. Teachers College Contributions to Education, No. 126, 1922.
38. MACCRACKEN, HENRY N. Mental Hygiene in the College Curriculum. *Mental Hygiene*, 1925, *9*, 469-477.
39. MANSON, GRACE E. A Bibliography of the Analysis and Measurement of Human Personality up to 1926. *Repr. and Cir. Ser. Nat. Res. Council*, No. 72, 1926. Washington, D. C.
40. MATHEWS, ELLEN. A Study of Emotional Stability in Children. *Journal of Delinquency*, 1923, *8*, 1-40.
41. MEAD, THEODORA. National Differences in Preferences and Beliefs. M. A. Thesis, Columbia, 1924.
42. MOORE, HENRY T. Innate Factors in Radicalism and Conservatism. *Journal of Abnormal and Social Psychology*, 1925, *20*, 234-244.
43. MORRISON, ANGUS W. Mental Hygiene and Our Universities. *Mental Hygiene*, 1923, *7*, 258-270.
44. MORRISON, ANGUS W. and DIEHL, HAROLD S. Some Studies on Mental Hygiene Needs of Freshmen University Students. *Journal of the A. M. A.*, 1924, *83*, 1666ff.
45. NACCARATI, SANTE and GARRETT, H. E. The Relation of Morphology to Temperament. *Journal of Abnormal and Social Psychology*, 1924, *19*, 254-263.
46. OLSON, ELMA M. A Study of the Emotions in Psychopathic Personalities. M. A. Thesis, Columbia, 1923.
47. PATON, STEWART. The Essentials of an Education. *Mental Hygiene*, 1920, *4*, 268-280.
48. PATON, STEWART. Mental Hygiene in the University. *Scientific Monthly*, 1924, *19*, 625-631.
49. PECK, MARTIN W. Mental Examinations of College Men. *Mental Hygiene*, 1925, *9*, 282-299.
50. PRESSEY, S. L. A Group Scale for Investigating the Emotions. *Journal of Abnormal and Social Psychology*, 1921, *16*, 55-64.
51. PRESSEY, A. L. and CHAMBERS, OTHNIEL R. First Revision of a Group Scale Designed for Investigating the Emotions, with Tentative Norms. *Journal of Applied Psychology*, 1920, *4*, 97-104.
52. PRESSEY, S. L. and COLE, L. W. Irregularity in a Psychological Examination as a Measure of Mental Deterioration. *Journal of Abnormal and Social Psychology*, 1919, *13*, 285-294.

53. PRESSEY, S. L. and PRESSEY, L. W. Cross-out Tests with Suggestions as to Group Scale of the Emotions. *Journal of Applied Psychology*, 1919, *3*, 138-150.
54. ROSANOFF, AARON J. A Theory of Personality Based Mainly on Psychiatric Experience. *Psychological Bulletin*, 1920, *17*, 281-299.
55. RUGGLES, ARTHUR H. College Mental Hygiene Problems. *Mental Hygiene*, 1925, *9*, 261-272.
56. SINGER, H. DOUGLAS. The Need for Instruction in Mental Hygiene in Medical, Law and Theological Schools. *Mental Hygiene*, 1919, *3*, 24-32.
57. SLAWSON, JOHN. Psychoneurotic Responses of Delinquent Boys. *Journal of Abnormal and Social Psychology*, 1925, *20*, 261-281.
58. SOMERS, G. H. Pedagogical Prognosis. Teachers College Contributions to Education, No. 140, 1923.
59. SOMMERVILLE, RICHARD C. Physical, Motor and Sensory Traits, *Archives of Psychology*, No. 75, 1924.
60. SUNNE, DAGNY. Personality Tests: White and Negro Adolescents. *Journal of Applied Psychology*, 1925, *9*, 256-280.
61. SYMONDS, PERCIVAL M. The Present Status of Character Measurement. *Journal of Educational Psychology*, 1924, *15*, 484-498.
62. TERMAN, LEWIS M. Character and Personality Traits of Gifted Children. In Report of the Proceedings of the Western Psychological Association. *Psychological Bulletin*, 1925, *22*, 328.
63. TOOPS, H. A. Tests for Vocational Guidance of School Children. Teachers College Contributions to Education, No. 136, 1923.
64. WATSON, G. B. A Supplementary Review of Measures of Personality Traits. *Journal of Educational Psychology*, 1927, *18*, 73-87.
65. WILLIAMS, FRANKWOOD E. Mental Hygiene and the College Student: First Paper. *Mental Hygiene*, 1921, *5*, 283-301.
66. WILLIAMS, FRANKWOOD E. Mental Hygiene and the College Student: Second Paper. *Mental Hygiene*, 1925, *9*, 223-260.
67. WOOD, BEN D. Measurement in Higher Education. Yonkers, N. Y.: World Book Co., 1923.
68. YOUNG, KIMBALL. Mental Hygiene and Personality Guidance in Colleges. *Mental Hygiene*, 1925, *9*, 489-501.
69. ZEIGLER, LLOYD H. A Study of X, Psychoneurotic and Otherwise. *American Journal of Psychiatry*, 1921, *1*, 199-210.

ARCHIVES OF PSYCHOLOGY

515 West 116th St., New York City

List of numbers, continued from inside front cover

63. Race Differences in Inhibition: ALBERT L. CRANE. $1.50.
64. Individual Differences in Incidental Memory: SADIE MYERS SHELLOW. $1.25.
65. Character Traits as Factors in Intelligence Test Performance: WILLIAM M. BROWN. $1.25.
66. A Study of the Sexual Interest of Young Women: F. I. DAVENPORT. $1.25.
67. The Psychology of Confidence: WM. CLARK TROW. $1.25.
68. Experimental Studies of College Teaching: HAROLD E. JONES. $1.25.
69. The Influence of Treatment for Intestinal Toxemia on Mental and Motor Efficiency: ALICE E. PAULSEN. $1.00.
70. A Study of Suggestibility of Children: MARGARET OTIS. $1.50.
71. The Value of Praise and Reproof as Incentives for Children: ELIZABETH B. HURLOCK. $1.00.
72. Attention and Interest in Advertising: HOWARD K. NIXON. $1.25.
73. An Experimental Study of Thinking: EDNA HEIDBREDER. $1.75.
74. Estimation of Time: ROBERT AXEL. $1.00.
76. Measurement of Emotional Reactions: DAVID WECHSLER. $1.75.
77. Tested Mentality as Related to Success in Skilled Trade Training: THEODORA M. ABEL. $1.25.
78. Aggressive Behavior in a Small Social Group: E. M. RIDDLE. $1.75.
79. The Memory Value of Advertisements: EDITH R. BRANDT. $1.25.
80. A Critical Examination of Test-Scoring Methods: ROSE G. ANDERSON. $1.00.
81. Thermal Discrimination and Weber's Law: ELMER A. K. CULLER. $1.75.
82. A Correlational Analysis of Typing Proficiency: LUTON ACKERSON. $1.50.
83. Recall as a Function of Perceived Relations: CORA B. KEY. $1.25.
84. A Study of the Consistency of Rate of Work: CONSTANCE E. DOWD. $1.00.
85. An Experimental Investigation of Recovery from Work: S. L. CRAWLEY. $1.25.
86. Facilitation and Inhibition: THOMAS N. JENKINS. $1.00.
87. Variability of Performance in the Curve of Work: JAMES D. WEINLAND. $1.00.
88. A Mental Hygiene Inventory: S. DANIEL HOUSE. $1.50
89. Mental Set and Shift: ARTHUR T. JERSILD. $1.25.
90. An Experimental Investigation of Rest Pauses: CHARLES W. MANZER. $1.25.
91. Routine and Varying Practice as Preparation for Adjustment to a New Situation. LELAND W. CRAFTS. $1.00.
92. The Development of a Standardized Animal Maze. L. H. WARNER and C. J. WARDEN. $1.25.
93. An Experimental Study of Speed and Other Factors in "Racial" Differences. OTTO KLINEBERG. $1.50.
94. The Relation of Reaction Time to Measures of Intelligence, Memory, and Learning. VERNON W. LEMMON. 80 cents.
95. Is the Latent Time in the Achilles Tendon Reflex a Criterion of Speed in Mental Reactions? GEORGE H. ROUNDS. $1.25.
96. The Predictive Value of Certain Tests of Emotional Stability as Applied to College Freshmen: EDWIN G. FLEMMING. $1.00
97. A Vocabulary Information Test: ANGELINA L. WEEKS. $1.00.
98. The Effect of Various Temporal Arrangements of Practice on the Mastery of an Animal Maze of Moderate Complexity: SIDNEY A. COOK. 80 cents.

In addition to the numbers of the Archives, the following monographs are to be obtained from us:

The Psychology of Association: FELIX ARNOLD. 50 cents.
The Measurement of Variable Quantities: FRANZ BOAS. 50 cents.
Linguistic Lapses: FREDERIC LYMAN WELLS. $1.00.
The Diurnal Course of Efficiency: HOWARD D. MARSH. 90 cents.
The Time of Perception as a Measure of Differences in Sensations: VIVIAN ALLEN CHARLES HENMON. 60 cents.
Interests in Relation to Intelligence: LOUISE E. POULL. $1.00. Reprinted from *Ungraded*.
The Conditioned Pupillary and Eyelid Reactions: HULSEY CASON. $1.00. Reprinted from the *Journal of Experimental Psychology*.

THE JOURNAL OF PHILOSOPHY

515 W. 116th St., New York City

Published on alternate Thursdays

$4 PER ANNUM, 26 NUMBERS 20 CENTS PER COPY

Edited by Professors F. J. E. WOODBRIDGE, WENDELL T. BUSH and H. W. SCHNEIDER of Columbia University.

ARCHIVES OF PHILOSOPHY

Edited by the Department of Philosophy

Columbia University, New York City

DIRECTORY OF
AMERICAN PSYCHOLOGICAL PERIODICALS

AMERICAN JOURNAL OF PSYCHOLOGY—Ithaca, N. Y.; Cornell University.
Subscription $6.50. 624 pages ann. Edited by M. F. Washburn, K. M. Dallenbach, M. Bentley and E. G. Boring. Quarterly. General and experimental psychology. Founded 1887.

THE PEDAGOGICAL SEMINARY AND JOURNAL OF GENETIC PSYCHOLOGY—Worcester, Mass.; Clark University Press. Subscription $7.00. 700 pages ann. Edited by Carl Murchison and an international coöperating board. Quarterly. Child behavior differential and genetic psychology. Founded 1891.

PSYCHOLOGICAL REVIEW—Princeton, N. J.; Psychological Review Company.
Subscription $5.00. 480 pages annually.
Bi-monthly. General. Founded 1894. Edited by Howard C. Warren and John B. Watson.

PSYCHOLOGICAL MONOGRAPHS—Princeton, N. J.; Psychological Review Company.
Subscription $6.00 per vol. 500 pp. Founded 1895. Edited by Shepherd I. Franz.
Published without fixed dates, each issue one or more researches.

PSYCHOLOGICAL INDEX—Princeton, N. J.; Psychological Review Company.
Subscription $2.00. 200 pp. Founded 1895. Edited by Walter S. Hunter.
An annual bibliography of psychological literature.

PSYCHOLOGICAL BULLETIN—Princeton, N. J.; Psychological Review Company.
Subscription $5.50. 720 pages annually. Psychological literature.
Monthly. Founded 1904. Edited by Samuel W. Fernberger.

JOURNAL OF PHILOSOPHY—New York; 515 W. 116th St.
Subscription $4.00. 728 pages per volume. Founded 1904.
Bi-weekly. Edited by F. J. E. Woodbridge, Wendell T. Bush and H. W. Schneider.

TRAINING SCHOOL BULLETIN—Vineland, N. J.; The Training School.
Subscription $1.00. 160 pages ann. Edited by E. R. Johnstone. Founded 1904.
Monthly (10 numbers). Psychology and training of defectives.

ARCHIVES OF PSYCHOLOGY—Columbia University, N. Y.; Archives of Psychology.
Subscription $6.00. 500 pp. per vol. Founded 1906. Edited by R. S. Woodworth.
Published without fixed dates, each number a single experimental study.

JOURNAL OF ABNORMAL AND SOCIAL PSYCHOLOGY—Albany, N. Y.
Sub. $5.00. Boyd Printing Co. Edited by Morton Prince, in cooperation with Floyd H. Allport.
Quarterly. 432 pages annually. Founded 1906. Abnormal and social.

PSYCHOLOGICAL CLINIC—Philadelphia; Psychological Clinic Press.
Subscription $2.50. 288 pages. Edited by Lightner Witmer. Founded 1907.
Without fixed dates (9 numbers). Orthogenics, psychology, hygiene.

COMPARATIVE PSYCHOLOGY MONOGRAPHS—Baltimore; Williams and Wilkins Co.
Subscription $5.00. 500 pages per volume. Edited by W. S. Hunter.
Published without fixed dates, each number a single research.

PSYCHOANALYTIC REVIEW—Washington, D. C.; 3617 10th St., N. W.
Subscription $6.00. 500 pages annually. Psychoanalysis.
Quarterly. Founded 1913. Edited by W. A. White and S. E. Jelliffe.

JOURNAL OF EXPERIMENTAL PSYCHOLOGY—Princeton, N. J.; Psychological Review Company.
Subscription $5.00. 480 pages annually. Experimental.
Bi-monthly. Founded 1916. Edited by Madison Bentley.

JOURNAL OF APPLIED PSYCHOLOGY—Bloomington, Ind.; Indiana University Press.
Subscription $4.00. 400 pages annually. Founded 1917.
Quarterly. Edited by James P. Porter and William F. Book.

JOURNAL OF COMPARATIVE PSYCHOLOGY—Baltimore; Williams and Wilkins Company.
Subscription $5.00. 500 pages annually. Founded 1921.
Bi-monthly. Edited by Knight Dunlap and Robert M. Yerkes.

GENETIC PSYCHOLOGY MONOGRAPHS—Worcester, Mass.; Clark University Press. Subscription $7.00 per volume. Two volumes per year, 600 pages each. Edited by Carl Murchison and an international cooperating board. Monthly. Each number one complete research. Child behavior, differential and genetic psychology. Founded 1925.

PSYCHOLOGICAL ABSTRACTS—Princeton, N. J.; American Psychological Association.
Subscription $6.00. 600 pages annually. Edited by W. S. Hunter.
Monthly. Abstracts of Psychological literature. Founded 1927.

THE PERSONNEL JOURNAL—Baltimore; William and Wilkins Co.
Subscription $5.00. 500 pp. Founded 1922.
Bi-monthly. Edited by Walter V. Binghan.

JOURNAL OF GENERAL PSYCHOLOGY—Worcester, Mass.; Clark University Press. Subscription $7.00. 600-700 pages annually. Edited by Carl Murchison and an international cooperating board. Quarterly. Experimental, theoretical, clinical, and historical psychology. Founded 1927.

ARCHIVES OF PSYCHOANALSIS—New York; 2 East 65th St. Subscription $20.00. 1000 pages ann. Ed. by L. Pierce Clark. Quarterly. Detailed analyses of cases of narcistic neuroses and psychoses showing psychoanalytic technic. Foreign abstracts and translations.

This book may be kept.....weeks.

A fine of two cents will be charged for each day books or magazines are kept overtime.

Two books may be borrowed from the Library at one time.

Any book injured or lost shall be paid for by the person to whom it is charged.

No member shall transfer his right to use the Library to any other person.